

In the Classroom 9

How Multiple Means of Representation Can Help Your Classroom

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Stan Skrabut: Thanks a lot for taking time to listen to this podcast. It certainly means a lot to me because I know you could be with anyone else like you're with me and I really appreciate it. We're going to continue on with our exploration of Universal Design for Learning and how it fits in with this idea of multimedia development. That's the class I'm teaching right now is on multimedia development and this just happens to be the topic of choice for the week and we're looking at Universal Design for Learning. Specifically, we're looking at the principle of multiple means of representation.

In the previous episode, episode number eight, we looked at the overall framework for Universal Design for Learning and if you remember we mentioned how CAST the center for applied special technology defines Universal Design for Learning. It's a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn. We mentioned that it had three principles. You have the effective network. Which is the why of learning and the multiple means of engagement. We have the recognition network or the what of learning.

This is where we are talking about multiple means for representation. Then finally we also have the strategic network or the how of learning. There's multiple means for action and expression which we will talk about in the next episode. Next week, tune in and we're going to talk about multiple means for action and expression. In this episode, we're going to focus on recognition networks or the what of learning. Really it's about how we are creating content that allows people to learn. I'm a huge fan of Universal Design for Learning. I mentioned that last week and I still am.

This is the ways that we are using the information that we learned on how people learn, how their brain operates to get the best out of it. These principles are absolutely essential to the learning function. Most of us have been teaching a certain way because that's just the way we learned. That's the way we think everybody should learn. We've done a lot of research on this. These guys the neuroscientists there are out there working like crazy to understand how the brain works and they're making a lot of progress. In this idea of this principle of multiple means of representation.

In that principle, there are a number of guidelines and we'll talk to that. At the core of it, if a learner cannot perceive it and cannot understand it, then we are wasting our time. If we put out bad instruction, bad content, and the learner cannot understand it, why are we doing? To me, that's the essence of it. I look in the classroom all the time and I see just horrible PowerPoint presentations. Horrible. We know better. We can do better but we don't and don't get it. That's one of my rants is I watch how we put together presentations and they're horrid.

They work entirely opposite on how the mind works in processing visual and auditory information. We can do better. This idea of representation ties into this multimedia development. There is not one optimal way that individuals consume information. Therefore by working to the margins, we need to provide choices. Different ways that they can consume information. Is it more work? Absolutely. Does it lead to better learning? Well, that's also true. We want to make sure that over time, this is not saying that you have to go in and immediately rework your course but incrementally let's keep improving it.

Let's take time to do that. I know it takes time and I know you have other things to do. Solicit your students for help if you need to. We've got to make improvements on this. The reason multimedia is central to this in my mind is that there are a lot of ways that we consume information. We provide lectures and that's typically auditory. We have slide decks that support that. That's visual. That's right there two different multimedia that are coming into play. We provide text in support like a textbook or we create videos or we link to videos on our learning management systems.

All those are different media, multimedia. In some cases, we are developing it and we can be doing this better. Why is it important? Well, one thing I told you about the brain but the problem is, is that our learners are not average. We don't have average students. We have individuals that are on a spectrum in terms of their understanding of different content. They're on a spectrum, on their ability to see. They're on a spectrum on their ability to hear. They're on a spectrum for a multitude of different reasons.

They are not average and because of that, we need to accommodate them by providing choice and support. There is not a single way that all of our students can consume information. They just don't do it in the same way. Some may have sensory disabilities. Truth be told, I hit 45 and I started falling apart. I no longer can hear well, okay. I have to position myself in a classroom so I can try to hear a little better. My vision is also deteriorating. Going back to PowerPoints, if I sit in the back of the room, I can often not read what's on a PowerPoint slide that we are trying to cram too much information onto one slide.

We're not testing it. We're not going to the back of the room and say, Hey, can I see this? If you as an instructor walked to the back of the room, you probably could not read your own slides. Well, that's certainly a hint that you need to do this better. For video, because of these sensory disabilities, we need to make sure that there are closed captions. One, it's law but two, it's also the right thing to do and it helps all kinds of people, not just people that have a sensory disability. Other disabilities that an individual may have, for example, they may have a learning disability.

We are not aware of all the disabilities that are in our classroom. That many of the individuals who have say a learning disability have not come out and asked for accommodations. It's unfortunate we have the tools to help them but they have not done this. We need to just take that into account when we are creating the content that we have. Other ways that individuals may not be able to consume the information, in the same way, is there may be a language or cultural barrier, where I work, we have a large group of international students that English is not their first language.

We have to teach is we make this assumption everybody is perfect in English. Here I am, I am trying to figure out a couple of different languages and I benefit from the closed captions. If I'm listening to a presentation in Dutch, for example, I'd love to have the Dutch not subtitled but the closed captioning in Dutch. As I'm listening and watching I can also read it and I know other individuals who are learning languages, they really appreciate that. That's helping me learn the language by having that extra support. On this multiple means of representation, there are three guidelines.

Each of these different principals each has three guidelines. Under this particular one dealing with representation. The three guidelines that we have is first, perception. This is about being able to provide content in more than one way so we can touch more than one sense. The other one is language and symbols. Making sure that we have a common understanding of terms. The fact that instructors are experts, they have a better understanding of terms. They're on one side of the spectrum where you have students who do not understand these terms.

There are times where you just banty around vocabulary that students have no idea what you're talking about. It's only because over time this is just common to your vernacular, to your discipline, but students don't necessarily get it. Then finally comprehension. Which is being able to construct meaning or generate new understandings, the information that we are providing. That's one of the things that we're trying to work on. We got a lot of stuff to cover. Let's dive in. Okay.

The first, that one that we're going to talk about, the guideline number one is talking about perception and I think this is an absolutely essential one that we need to work on and this is if they don't understand it if they can't recognize it, if they can't input the information at all, then we are wasting our time. In this one, there's three checkpoints. The first checkpoint is that we offer the learners ways to customize the information and this is what I mean. If you hand out a piece of paper in your classroom, somebody who is visually impaired may not be able to read that information.

However, if you also put it in the learning management system as a digital document, they can then manipulate it maybe with a text to speech reader or they can magnify it. They can do all those little tricks that they know to make it available to them. Just simply handing out as a piece of paper, they may not be able to perceive that. Therefore they can't understand it. Therefore, honestly, it's a waste of time. Not everybody is an abled body-person, a matter of fact, all of us are temporarily abled-body persons, that over time, we are going to fall apart, we're going to lose our sight, we are going to lose our mobility, we're going to lose our hearing, that is the way it is. Let's do ourselves a favor, if no one else and start creating content that we're going to be able to check out later. We need to make sure that the content that we are providing, we allow this flexibility. If we put a video out there, we need to ensure that the user has the controls to maybe slow it down so they can listen to it better.

For audio, for example, and the podcasts I listened to, I jack it up to 1.5. so I listened to it quicker because I want to consume more information. Somebody who is struggling with language or has a learning issue, they may want to jack it down to 0.75. They want to be able to listen to it so they can comprehend it, instead of just forcing it in one way. The same with video, having those controls where you can pause, take some

notes, rewind and do it again, giving those options. Everything that we create, we should think about accessibility when we create documents, making sure that we use headers and bullets properly.

All those little principles on creating a document will make it easier for somebody who has a disability to be able to access that particular document. It also makes the document work better. It allows them to change the size of the text, it allows them to use other tools that they have at their disposal. Other considerations are, we try to jazz up-- We do this very often when we're sending out invitations. We create this wonderful PDF of this beautiful image, but screen readers can't read it very well so we're not helping the audience we want to have attend our functions, come to our functions because we didn't also take time to create a text version of that, that would maybe make it a lot easier.

Those are things to consider. Call-outs, having those special call-outs, they look beautiful, but they may not be good for somebody who has to use special devices to read your documents. Checkpoint number two, alternatives for auditory information. You put out an audio file, what if they can't hear it? How are they going to be able to hear this information?

Having closed captions, transcripts, maybe someone do an American Sign Language, having diagrams, all are supporting. If you have somebody in your class that's hard of hearing and all you do is lecture, they could be in deep trouble. Having some visual support, those PowerPoint slide decks can be useful if done correctly. It also benefits everyone else in the class. Having an alternative way of doing something if there's a need for some kind of alert, to just having audio is not the only way, maybe something visual that flashes or something that gets their attention could be useful.

Checkpoint number three, alternatives for visual information. How do you see your documents or your image or your video if you can't see? Good question. Ways that you can do this is one, like for images is having an alternative tag, they're called alt tag. I mean, you hear us emphasize these all the time that it is just a text description of what the image is. If it happens to be a graphic, a chart, having some type of textual explanation to it are important.

The sciences, for example, you may want to have physical models that somebody who is visually impaired can run their hands over so they're not missing out. Having an audio description, that you have an audio file that describes what you're looking at. These are just different options. If you're going to provide information like something that's textual, make sure that it's also accessible so screen readers can look at it. Make sure all those things balance together.

Now, we're moving on. That first guideline is dealing with perception. Can they actually see or hear your information and then help make understanding out of it? That's the first one. Guideline number two, this deals with languages and symbols. If I asked you, "Well, so a carbonated beverage in different parts of the country mean different things that in some places, it's soda, some places, it's pop, some places it's soda pop, in other places it's Coke, "What kind of coke you want?" "Orange." Having a common vocabulary is really important.

We have people that come from different backgrounds. When I first was in the Air Force, we had people all over the country come together. It was just interesting to hear how people referenced one thing compared to a different part of the country. That's where I come to understand this whole carbonated beverage, somebody talking about soda pop, it's like, "What the heck are you talking about?" Now I know. Same thing with a sandwich that you have a hero, hoagie, a submarine, a sub, grinder. They're all different types of sandwiches of a really the same type.

As a matter of that, we get down to the same definitions, that word. Oh, let me get back to this guideline two. This has five checkpoints. The first one happens to be clarifying vocabulary and symbols. That's number one. In this clarifying vocabulary, things that you want to do is pre-teach vocabulary. Pull out vocabulary lists, give them a vocabulary with definitions. I would even enhance it with links to where they can hear what the word actually sounds like. There was a word I was bantering about because I thought I was smart and come to find out I was pronouncing it entirely wrong for the longest time. Being able to do that.

A really great way of increasing the lexicon for students in your discipline is to actually have just review tests or review quizzes that are randomly generated that they can earn extra points taking. You don't want to necessarily make high stakes tests out of this, but where they can earn extra that just focuses on vocabulary. It takes a little bit of time to build them but over time, you can create this massive pool that you keep introducing new words from each chapter.

With foreign languages, also incorporating imagery to demonstrate what those words look like, that everybody understands what a dog looks like, cat, having those words. Build glossaries or better yet, have students build glossaries. There's tools in Blackboard which is the learning management system I use that you can build these glossaries. Have students do it. Also, provide links where they can go explore how these different words came about, what the meanings of them are, that always helped.

Checkpoint number two, clarify the syntax in the structure. If they don't understand the structure or the syntax of phrases and things that are essential to your discipline, then that's going to affect comprehension. Ways that you can do this is use concept maps where you can show relationships between each elements. Concept maps, also considered mind maps, where you have nodes that link out to other nodes. You can focus on those different concepts. Yes, I will see if I can put some links to ideas for concept maps in the notes. Highlighting keywords, transitional words, being able to show those relationships as you're deconstructing an essay or research article or something to that nature.

Checkpoint three. This checkpoint, you are providing support to be able to decode texts or mathematical notation and other symbols. Others support say you would weave in that wouldn't necessarily slow down instruction is allowing like text-to-speech where the user can consume the information. It comes in where somebody maybe is talking it out as opposed to reading it. That may just provide better understanding. You have automatic voicing that's also available for mathematical notation. This is usable or is very useful. Providing just different examples where other people are teaching

the same concept. Sometimes they just teach it just a little different where somebody just gets what the idea is. Relying on other media to help you do that.

Checkpoint number four is promoting understanding across languages. Like I said, we have a lot of international students where English is not their first language. Providing those vocabulary lists that include definitions, but also really important pronunciation that will help them. There is a wonderful study that happened in India, where students taught themselves how to speak better English without the aid of formal instruction. It was really linking back to the Oxford Dictionary to get the proper pronunciation. Every discipline has special vocabulary, so making sure that you have those type of vocabulary lists. If you have students that come from a specific country, have them build out glossaries for you on those specific terms that you- -can use over and over for future students that come in. You can turn them on and off, but that'll be a really useful tool. If your students prepared that that would be just absolutely wonderful. Anytime that you can support learning a vocabulary with other senses like visual, creating videos, or having imagery, that makes it very useful. The the last checkpoint in this area where we're dealing with language and symbols, this checkpoint is the use of multimedia to help illustrate points. A lot of what we do in class is based on auditory where we're doing a lot of lecturing or they're doing a lot of reading.

Text takes out the emotions and the nonverbal communication pieces and so it's not necessarily the strongest way to present information. If you can support that by finding other examples of media, that will just improve your instruction, giving them different choices on what they'll see. Ideally, if you have documents, provide links in there where you are hyperlinking, maybe back to a video or hyperlinking to another document that has more specific information, ways of improving your documents that way.

The third and last guideline is focusing on constructing new meaning and understanding. The goal of education is not necessarily to fill them up with all this new information, but it's about how they can use that information and be able to apply it so that they're taking in this new information to create new understanding. We typically do this through scaffolding, that when we're presenting information we try to build upon previous information and so this all applies into this area. One of the, I think the really important pieces here in this particular guideline is teaching learners how to learn to process this new information.

Four happens to focus on activating or supplying background knowledge, being able to help them tap into something that they already know. Part of it is providing them this foundational information if they didn't have it in the first place. You can do this using advanced organizers. One is the KWL. In this method, you tap into what they already know, what they want to know, and what they have learned. It is done in phases, but basically, if you're introducing a new concept, you have them write down everything they know on that particular concept and then have them look for gaps on what they want to know, and then in the end, what kind of new things do they happen to find.

In this area, in this particular checkpoints, concept maps are also really important to help organize that information. Being able to use a concept map or a mind map you can tap into their knowledge. There's different ways doing this, you can go in and put

the map up yourself or you can have the students do this, have them go to the board and work in groups to build a concept map on a specific topic. If they're missing critical information, one of the things that you can do is supply this in the course that may not be in your weekly discussions, but you may build an area for this prerequisite concepts, things that they should have touched upon before getting to your class.

You can build out a little area as a place to say, "Hey, if you don't understand this, go review this information, and here it is" Providing those type of supports. You can create these self-paced modules or have videos that are there. Other ways that you activate this knowledge is create analogies or metaphors to help bridge these ideas from things that they already know to these new things that you're trying to share with them.

Checkpoint number two is, being able to highlight these patterns or show these key ideas or relationships with these ideas. As instructors, experts, this discipline, you are an expert in this particular discipline. You know what cold but students aren't. There's this huge gap where you assume they know things that really they don't. I had this in a number of instances as I was moving to get my doctorate. Somebody in my committee mentioned some concepts, and it's like, "I have no idea what you're talking about."

Well, it's like everybody knows that. Well, obviously not because I just don't know it. You don't know it. It's hard to explain. Basically, as an expert, we understand what the key information is. We understand what the key patterns are. One of the key pieces is teaching learners new to the discipline, how to recognize those patterns. Ways of doing this is certainly identifying those key terms, using outlines or other organizers to help them be able to see those patterns or that understanding, continuously providing multiple examples that are relevant to that particular discipline.

Highlighting previously learned material and just kind of tying everything back to things that they already should know, and those are ways that you can help them be able to think like an expert in your discipline and be able to recognize those patterns.

Checkpoint number three, we're focusing on guiding the information processing. Really important is it comes to this idea of scaffolding, and part of that scaffolding is chunking information into smaller elements that don't just overwhelm learners by trying to dump everything on them but break it down into chunks and show how each chunk is interrelated. That you may start with a broad overview of a particular topic and then break it down into these elements. For example, in this discussion about Universal Design for Learning, there's these three major principles, and in each principle, there are three guidelines, and here's those guidelines.

Under those guidelines, there's these checkpoints, and this is how they all interrelate. Those are ways that you want to consider presenting that information and just progressively release this information. You don't necessarily have to dump it all on them at one time. One of the really important items in this is to remove unnecessary distractions. One of the benefits of open education resources, which we had talked in a previous episode, what episode was that? Let me think real quick. I'm looking, I'm looking.

Is we talked about it in episode number three that all we are is really useful because you can onto the essentials of what a learner really needs to know. Whereas a commercial textbook, they throw the kitchen sink in there. That there's a lot of fluff that it's good to know stuff, but it's not essential. By using OER, we can get down to the essential get rid of these unnecessary distractions. If you happen to be using something that has a sequence or a process, being able to specifically talk about each step independently helps with this learning process and being able to understand this information processing.

The very last checkpoint in this section happens to deal with being able to maximize transfer in generalization. What we want learners to be able to do at the end of the day is not only apply this in the discipline that we have but if they can apply the skills that we teach them to other disciplines, all the better. Ways that you can do that is using job aids such as checklists, different organizers, electronic reminders, templates, all these different ways of giving them the tools that they can modify or use directly and they may be able to apply it into different situations.

Teaching them how to use mnemonic strategies. One, there's one that I remember all the way back into middle school ROYBIV, red, orange, yellow, green, blue, indigo, violet. To this day, it's burned into my mind. Another one is M DAS, probably don't remember it that way. Please Excuse My Dear Aunt Sally, which talks about mathematical or do things with parentheses, and then exponents, multiplication, division, addition, subtraction. Just knowing that mnemonic strategy can help me solve various problems a lot easier.

Other ways that you can help with this transfer is provide additional opportunities to practice and review. The more opportunities that they can make, internalize this information, makes it easier for them to be able to go out and transfer it somewhere else. As I mentioned, providing templates to help with their note-taking but also templates are useful tools as strategies to apply in other situations, so providing those that kind of information. That is a lot of information that we end up covering today.

The goal is, through these three different guidelines that are under this representation principle, multiple means of representation, principles, which deal with perception, your language in symbols, and in constructing new meaning. At the end of the day, this will help learners better understand the content you're providing. That they will be able to achieve the objectives that you're trying to achieve. That's why it's important. A lot of this content is going to rely on developing different multimedia for your courses. Therefore, you really need to understand all these multimedia development skills, a lot of stuff.

Before you go, because I'm proud of it. Here's a quick plug for my book.