



**U.S. National Library of Medicine**  
*National Network of Libraries of Medicine*  
*Training Office*

# TEACHING TIPS BOOKLET

Developed resources reported in this site are supported by the National Library of Medicine (NLM), National Institutes of Health (NIH) under cooperative agreement number UG4LM012344 with the University of Utah Spencer S. Eccles Health Sciences Library. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIH

Updated 4/3/2017

# Table of Contents

	Page
Table of Contents.....	2
What do Bali and the Drug Information Portal Have to do w/Each Other?.....	4
Looking for Author Keywords in all the Right Places.....	5
OpenI and MedPix: Free Clinical Education Resources From NLM.....	6
Andra...What?.....	7
Online Learning and Motivation: 3 Ways to Keep them Coming Back.....	8
Break It Down: 5 Benefits of Chunked Learning.....	8
4 Ways to Add Interactivity.....	9
Teach Back.....	10
Should You Flip It?.....	11
Storytelling as a Teaching and Learning Tool.....	12
Why Tell Stories.....	12
Try the New Q&A Feature in Google Slides for Engagement.....	13
5 Reasons to Use Backchannels and 3 tools.....	14
Make Your Handouts Accessible for Everyone.....	15
Teaching topics: Openers and Closers.....	17
UDL for Teaching Face-to-Face and Online.....	19
References.....	24

Hello!

We are proud to publish the Teaching Tips Booklet. As the NNLM Training Office since 2016, and prior to that the NNLM Training Center from 2012-2016, we have a long legacy of blog posts. We did a little searching around our blog archives and selected the ones that discuss the training side of what we do - adult learning principles, instructional design, teaching technologies and tips on how to use them. We've compiled them here in the NTO Teaching Tips Booklet for your perusal.

We hope you like it!

Sincerely,

The National Network of Libraries of Medicine Training Office

Jessi, Molly, Sarah, Rebecca and Remzi

Booklet Designed by: Remzi Kizilboga

Content Written by: Rebecca Brown, Remzi Kizilboga, Molly Knapp, Cheryl Rowan, Jessica Van der Volgen

Published May 2018

[nto@utah.edu](mailto:nto@utah.edu)

## What do Bali and the Drug Information Portal Have to do w/Each Other?

Posted by [Rebecca Brown](#) on [December 11th, 2017](#)

### What happened?

I was supposed to be on vacation in Bali, Indonesia at the end of November. But instead, I found myself still in Prairie Village, Kansas. Why am I telling you? Because mother earth, yes that earth, had other plans for me and Bali, namely the eruption of a volcano. Here is an impressive view of all the volcanoes in that part of the world: [Volcanoes<sup>1</sup>](#) The airport closed and my flight was cancelled. So instead of being on a beach, I had some extra time on my hands.

### Why We Teach TOXNET

The NTO teaches TOXNET not necessarily with the consumer or end-user in mind, but with the librarian or teacher in mind; a person who will help the consumer find reliable information or who will introduce students to a suite of databases that they can use as they go forward in their careers. I found myself, however, as an end-user (while not in Bali).

### Teacher as End User

My father is 87 and now lives alone since my mother died about two months ago. He's never been very good at taking care of himself. We discovered that all of his medications were mixed up and he had run out of some crucial medication; life sustaining medication. So I drove to his home (while not in Bali), which is about an hour away and I proceeded to organize his medicines. I got all of his prescriptions filled and bought a pillbox to fill and dispense his daily pill regimen. Then, I used the Drug Information Portal to look up images of all his pills. Did you know that was a feature of the portal? The Drug Portal has a deceptively simple interface, but links to all sorts of helpful information including clinical trials and the package inserts that are submitted to the FDA by drug manufacturers. There is also a link to a National Library of Medicine project called [Pillbox<sup>2</sup>](#), which is designed to help in the identification of pills (you know, the ones you find on the floor or at the bottom of your purse). It's usually the last item on the list in the Summary section of a drug record. Look for: Drug Identification and Image Display (Pillbox). So there I was, using the flashlight on my phone to try and see the imprints on my father's pills. The flashlight (along with my reading glasses) wasn't enough. I still couldn't see the tiny pill imprints. I went looking for the lighted magnifying glass that I had bought for my mother. Using Pillbox, I was able to find and print images of the exact pills (the imprints matched the pictures) and created a list of my father's current medications that included pictures (front and back) of each pill. **Thank you Pillbox!**

## Looking for Author Keywords in all the Right Places

Posted by [Rebecca Brown](#) on [February 22nd, 2018](#)

**D**o you work with researchers as they get ready to publish their work? Have you received phone calls (yes, that's a thing) or emails from authors asking for help in choosing keywords for the articles they've written? Have *you* done research that is going to be published? So many questions... The National Library of Medicine has some general suggestions for authors of journal articles who are interested in selecting Medical Subject Headings (MeSH) terms as keywords for their articles.

MeSH has two tools to help authors with selecting terms for their articles: **1) MeSH on Demand and 2) the MeSH Browser**. I love the MeSH on Demand (MOD) tool because it automatically maps words from the author's text (any text) to MeSH terms. You can paste text from the abstract or the full article (up to 10,000 characters) into the box that displays on the MOD page, hit Search and watch the wheel spin while MOD does its thing. It not only displays suggested MeSH terms, but identifies specific articles that were also used in computing the recommended terms. You can then go even further and look at the MeSH terms that have been assigned to each of those articles by NLM Indexers. Note: The terms that MOD displays for you are machine-generated; there is no human review of the text that you input.

[How to use MeSH on Demand<sup>3</sup>](#)

[Direct link to MeSH on Demand<sup>4</sup>](#)

The second tool is the [MeSH Browser<sup>5</sup>](#). This is different from the MeSH database that many of us use on a regular basis. You can use the database to map author words to MeSH terms, but the Browser goes a step farther. By checking the button that says "Search in all Free Text Fields" you can search annotations, scope notes and Supplementary Concept notes, which provides additional sources of keywords.

*Blog post adapted from:* <https://www.nlm.nih.gov/mesh/authors.html>

## Open and MedPix: Free Clinical Education Resources From NLM

Posted by [Molly Knapp](#) on [January 16th, 2018](#)

NNLM staff recently had an internal presentation on some resources built by [Lister Hill Center for Biomedical Communications](#)<sup>6</sup> – the research arm of the National Library of Medicine. They have built some amazing tools for clinical education and medical images that are for free to anyone with an internet connection.

[Open-i](#)<sup>7</sup>



Open-i is an open access biomedical image search engine

**What it is:** Open access biomedical search engine, 3.7+ million images from over 1.2 million PubMed Central<sup>®</sup> articles; 7,470 chest x-rays with 3,955 radiology reports; 67,517 images from NLM History of Medicine collection; and 2,064 orthopedic illustrations, plus MedPix (see below).

**Cool Features:** *Query by Image* allows users to drag and drop an image to find similar photos. An

“enriched citation” view summarizes key points of abstract and links out to more information. Limit search by License Type is great for users looking for images to reuse for teaching or publishing.

**Bottom line:** A great tool for students who need practice interpreting x-rays and lab results and faculty seeking images for various purposes.

[MedPix](#)<sup>8</sup>



MedPix allows users to toggle quiz and clinical case information on and off for study purposes.

**What it is:** Open-access online database of medical images, teaching cases, and clinical topics, integrating images and textual metadata including over 12,000 patient case scenarios, 9,000 topics, and 59,000 images.

**Cool Features:** Toggle quiz information on/off. Earn free AMA Category 1 CME credit with each completed case. Faculty can submit cases of their own using a [simple tool](#)<sup>9</sup>. Multiple search options include by symptom, diagnosis, organ system, keywords and more.

**Bottom line:** One of the world’s largest open-access teaching files – a must-see study aid for any student of clinical medicine in a radiology rotation.

## Andra...What?

Posted by [cherylrowan](#) on [May 9th, 2016](#)

Anyone who has done teaching or taken classes in teaching methods has likely heard the term “pedagogy.” This term is most widely used currently to mean “the art and science ... of teaching,” although the original meaning was actually more specific to teaching children. As librarians, we strive to create instructional materials that are appropriate for the learning needs of our students. For this reason, andragogy may be a better alternative and approach, especially for adult and online learners.

Andragogy as a methodology has its roots as far back as 1833 with a German teacher named Alexander Kapp, although its current usage is attributed to Malcolm Knowles, who adopted the word to describe the differences in the ways individuals – especially adults – learn.

Pedagogy and andragogy are very different teaching models. For example, pedagogy is considered a content model, whereas andragogy is a process model. The process model aims to provide the skills and resources needed to acquire information, rather than simply presenting information. Andragogy encourages the teacher as facilitator, where the emphasis is on enabling the student to learn. For adult learners and online students, andragogy may provide a more suitable teaching model. And, with the increasing tendency toward online classes, students are increasingly self-directed.

This table illustrates key differences between pedagogical and andragogical design.

It should be noted that these two methods are not mutually exclusive. It is always up to the the teacher or facilitator to determine the best approach for his or her students.

For more information, please see the full article, [“Keeping Up With ... Andragogy”](#)<sup>10</sup>

Design Elements		
	Pedagogy	Andragogy
Climate	Authority-Oriented Formal Competitive	Mutuality Respectful Collaborative Informal
Planning	By teacher	Mutual planning
Diagnosis of Need	By teacher	Mutual self-diagnosis
Formulation of Objectives	By teacher	Mutual negotiation
Design	Logic of the subject matter/Content units	Sequenced in terms of readiness/problem units
Activities	Transmittal techniques	Experiential techniques
Evaluation	By teacher	Mutual re-diagnosis of needs/mutual measurement of program

Source: Knowles, 1973

## Online Learning and Motivation: 3 Ways to Keep them Coming Back

Posted by [Rebecca Brown](#) on [Nov 3rd, 2014](#)

**W**e've all been there. We sign up for an online class with every intention of completing the class, but somewhere along the way things get in the way and we don't finish the class. They call it the U-Shaped Curve: "Novelty and enthusiasm produce high drive at the beginning, but it drops off sharply thereafter, only increasing when the end of the course is in sight."<sup>11</sup>

Here are a few suggestions for course builders to keep motivation and interest up:

1. Offer Choice: Break content into smaller modules and allow students to choose only those modules that are most important to them.
2. Within the smaller modules, offer even more options to access the material. For example, you can include a short video, hands-on exercises, a follow-along tutorial. Bite-sized lessons allow students to get a sense of accomplishment, which in turn may spur them on to do more work.

3. Provide feedback; because cyberspace can be lonely and we never really know what happened to that homework we uploaded. As the instructor, set a goal for yourself: I will grade and respond to students within X amount of days. Turn this goal into a class policy and include it in the "about this course" section.

## Break It Down: 5 Benefits of Chunked Learning

Posted by [Rebecca Brown](#) on [April 28th, 2014](#)

- B**ite-sized learning, coffee-break webinar, lunch and learn, chunked learning. Whatever you call it, many people want their training options short (chunks) and on demand. Here are 5 thoughts on how smaller can be better.
1. Fights boredom. No frills, to the point.
  2. Promotes a sense of accomplishment.
  3. Our energy comes and goes throughout the day. Our interests come and go throughout the day. Providing to-the-point training opportunities allows an individual to fit training into their inner productivity clock.
  4. Bite-size chunks of information are easier to process and transfer to long term memory.
  5. Makes the learner feel that their time constraints are understood and respected.

## 4 Ways to Add Interactivity

Posted by [jvandervolgen](#) on [March 5th, 2014](#)

**I**n January, I attended a presentation called Making Interactivity Count by Cammy Bean, Vice President of Learning Design at Kineo. You can find her slide deck on [Slideshare](#)<sup>12</sup> and I recommend looking at her other presentations as well. Here are a few of my takeaways from her talk. Though her points were geared to the elearning environment, they are highly applicable to the face-to-face classroom as well.

When designing instruction, we try to incorporate interactivity. But what is interactivity? Interactivity occurs on a spectrum and can be human-to-human, or human-to-thing. Even thinking meaningfully can be interactive. Her four strategies for incorporating interactivity are:

1. Get them reflecting! Have your students practice integrating the content into their own mental schema. Ask a question to get them to stop, think, and apply what they have just learned. For example, what are you going to start doing, stop doing, or continue doing with this new knowledge?
2. Get them feeling! Make your stories or examples about real people or put the learner in the story. Ask them questions about the story or why it matters.
3. Get them acting! Build in worksheets or have students assess what's going right or wrong with a scenario. For example, if you demonstrate a search that returns zero results, have your students determine why and how to fix it. Ask students what they would do in a given situation.
4. Get them connecting! Have your students talk to each other. Use a survey and share the results.

A few other words of caution from Cammy Bean:

- Don't add interactivity just for the sake of interactivity (or as Cammy put it, Beware the clicky clicky, bling bling!)
- Be sure that the interactive elements have context
- Don't allow the interactivity to overwhelm the content



## Teach Back

Posted by [jvandervolgen](#) on [April 24th, 2014](#)

**W**hat do you do when you have a difficult concept to teach your students? Do you give the best possible explanation and then ask if there are any questions? If you've tried that method, chances are you've been met with a few blank stares.

One strategy we like and use is the teach-back method. The teach-back method is often used in the healthcare setting to check in with patients that they have clearly understood the healthcare professional's instructions. It's not used as a test or a quiz, but rather to gauge if the teacher's explanation was effective and if there are any points that need to be clarified or reemphasized.

You can use this tool in your classes by partnering students in groups of two or three to have them explain or recap any material you have introduced. You might say, "Turn to the person next to you and take turns explaining what we just talked about."

A few examples:

- When would you use X instead of Y for your search?
- What's the difference between Database X and Database Y?
- How do you get the full-text of an article?

While students are teaching each other, you can circulate to listen for misconceptions. At the end, you can ask the class for any points of confusion that came up during their discussion, for volunteers to relate their explanations, or for students to then apply the concept to an example.



## Should You Flip It?

Posted by [jvandervolgen](#) on [December 11th, 2013](#)

**I**f you're at all connected to teaching and training, you've likely been hearing more and more about the flipped classroom. The basic idea of the flipped class is to switch how students and teachers spend their time. In the flipped model, teachers prepare and record videos or lectures for the students to view on their own time and then class time is used for solving problems together or other active and collaborative exercises.

If you're considering the pros and cons of flipping some of your classes, Teach Thought has a [short article](#)<sup>13</sup> that you might find helpful. Although it's geared more toward the elementary and secondary school classrooms, there are still valuable points to consider. For example, the flipped model gives students more control (an important principle of adult learning, as well) and allows them to easily repeat lessons if needed. On the other hand, it can require significant work on the front end to prepare for the class.

The good news is that a flipped classroom doesn't have to be all or none. You can deploy elements of the flipped classroom without completely changing your course or class. The NTO has experimented with employing elements of a flipped classroom in some of our classes. For example, we might assign a video to watch and then use more of our time together for practice exercises or addressing difficult questions. While we have by no means entirely flipped the classes, we have received some positive feedback on having more time for doing hands-on work together.



## Storytelling as a Teaching and Learning Tool

Posted by [Rebecca Brown](#) on [October 11th, 2011](#)

**H**ave you taught a class and had someone ask, why is this important to me? Stories are a means of engaging students, and can create a memorable way to process new information. The following link will take you to a posting by Connie Malamed, an eLearning, information and visual designer, with a Masters Degree in instructional Instructional Design & Technology. Connie has posted 10 reasons why stories are important for learning.

For more, you can read the article on [“Why You Need To Use Storytelling For Learning”](#)<sup>14</sup>

### Why Tell Stories

Posted by [jvandervolgen](#) on [March 25th, 2015](#)

**T**ake a minute and think of a story that inspired you. Maybe it changed your mind about something, spurred you to action, or just made you think. Don't you hope your classes do the same for students?

We often hear about the importance of using stories to in classes to engage students and improve understanding, but let's take a look at a few reasons why stories work.

- **Stories help us connect emotionally with our students**, and when we do that, our students are primed to believe us.
- **Stories sharpen our curiosity**. If you're reading a good story, you want to continue reading and find out what happens next. The same is true for learners. A student trying to predict the next event is more engaged in learning.
- **Stories give relevance and context to the lessons**, which helps students identify what's in it for them.
- **Stories make complex concepts easier** to understand by demonstrating what learners should do.
- **Stories are easier to process**. Since you learned to read you've been making sense of stories, but you've had to learn to process graphs and charts.

To learn more about why stories work, check out [this publication from SHIFT e-Learning](#).<sup>15</sup>

## Try the New Q&A Feature in Google Slides for Engagement

Posted by [Rebecca Brown](#) on [May 5th, 2016](#)

**H**ave you tried Google Slides? I don't use it on a regular basis, but I just learned about a new feature called Q & A. Q&A is designed to let audience members ask questions during a presentation (anonymously, if they prefer).

**What's so novel about that you ask?** Students use their smartphone or other smart device to submit questions to the instructor at any point.

**OK, but what else can Q & A do?** As questions are submitted via a shared URL, students “like” questions that they what to know the answer to. The instructor sees, in real-time, which questions are most important to the audience.

**What are some ways to use the Q & A feature in Google Slides?**

- Can be used for in-person and online sessions
- Fosters inclusion for remote participants
- Students can ask questions when they come to mind
- Gauge knowledge; Who knows what in the “room”?
- Use instead of traditional chat box as a way to moderate chat
- Meets users where they are, their smart-devices
- Audience size doesn't inhibit participation

Here's a short video by [Richard Byrne](#)<sup>16</sup> on how to use the tool.

## 5 Reasons to Use Backchannels and 3 tools

Posted by [Rebecca Brown](#) on [June 13th, 2017](#)

**W**hat is a backchannel? A backchannel, as used in education, is a flexible tool that can be used to extend a classroom conversation.

### 5 reasons to use a backchannel

1. A backchannel provides a secure place for shy or quiet students to speak.
2. We're not all ready with a quick answer, providing a backchannel allows those who take longer to gather their thoughts a time and place to contribute to the discussion.
3. A backchannel can provide a safe place to express personal opinions about a topic.
4. Backchannels can extend a conversation even when class is over.
5. You can use a backchannel to conduct a formative assessment during class.

### The right tool...

- **Padlet (free)**

I love Padlet (I've written about it before). Basically, it's a blank wall and you can decide what you want to "hang" on it. You can use Padlet to: take notes, solicit feedback, as a discussion board, it can be used during a meeting instead of a round robin, it can be used to gather comments prior to a meeting to build an Agenda. Postings are anonymous by default. No login is required.

- **Today'sMeet (free)**

Create a room using Today'sMeet. You can decide how long the room should stay open and whether or not to require a login. Participants must use a name or a nickname in order to post. No login is required.

- **Socrative (free for up to 50 participants)**

Socrative is a more involved tool. You can create quizzes, a quick question using T/F, short answer or multiple choice.

## Make Your Handouts Accessible for Everyone

Posted by [Molly Knapp](#) on [June 19th, 2017](#)

As a government-funded agency under the department of Health and Human Services (HHS), NNLM is required to comply with [section 508 policy](#)<sup>17</sup> as it applies to all products and services produced by the RMLs and Offices on behalf of the National Library of Medicine. Plus it's the right thing to do – we want our content and products to be accessible to everyone.

Here's a list of tools and links we use to make sure our online content is accessible and functional. All of these links are free and from reputable sources.

### [NCDAAE cheat sheets](#)<sup>18</sup>

Step by step directions (with pictures!) for creating accessible versions of common types of files (MS Word, Powerpoint, Excel). Includes directions for both Mac and PC. Does not include the newest versions of MS Office. From the National Center of Disability and Access to Education.

### [WAVE accessibility Tool for Firefox & Chrome](#)<sup>19</sup>

The WAVE Chrome and Firefox extensions evaluates web content for accessibility issues directly within Chrome and Firefox browsers. The extension can check intranet, password-

protected, dynamically generated, or sensitive web pages, and, according to its website, is 100% private.

### [Accessibility Developer tools for Google Chrome](#)<sup>20</sup>

Adds an Accessibility audit and sidebar pane to Chrome Developer Tools, so you can load a webpage then check to see that it is compliant in the same browser window.

### [Adobe Acrobat DC accessibility guides](#)<sup>21</sup>

While you must have Adobe Acrobat Professional edition to utilize most built-in accessibility tools, all versions of Adobe Acrobat DC, Adobe Acrobat Reader DC, Acrobat Standard DC and Acrobat Pro DC provide support for the accessible reading of PDF files by persons with disabilities.

### [Federal Social Media Accessibility Toolkit Hackpad](#)<sup>22</sup>

Tips on making social media accounts more accessible, including 5 Things Every Social Media Content Manager Needs to Know about accessibility. Coverage includes Facebook, Twitter, Snapchat, YouTube and more.

### [About Section 508<sup>23</sup>](#)

In 1998, Congress amended the Rehabilitation Act of 1973 to require Federal agencies to make their electronic and information technology (EIT) accessible to people with disabilities. The law ([29 U.S.C. § 794 \(d\)<sup>24</sup>](#)) applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508, agencies must give disabled employees and members of the public access to information that is comparable to access available to others. The United States Access Board [discusses the Section 508 law<sup>25</sup>](#) and its responsibility for developing accessibility standards for EIT to incorporate into regulations that govern Federal procurement practices.

## Teaching topics: Openers and Closers

Posted by [Molly Knapp](#) on [September 27th, 2016](#)

**D**id you miss NTO's free webinar "Teaching Topics: Open and Close with Impact" last Thursday? If you weren't a part of the 80-strong attendees, have no fear, for a recorded edition is being sliced and diced for our [YouTube channel<sup>26</sup>](#) right now. In the meantime, this post will review several classroom activities & concepts discussed in our webinar. (But not everything! For that you'll have to wait for the video and/or our next scheduled webinar.)

First off, what is an opener and a closer? These are classroom activities that frame an instruction session. A popular misconception in instructional metaphor is to think of a class like a sandwich – the opener and closer are the bread, while the content – what you really want folks to learn – is the meat.

This is wrong.

Why? *Serial position effect*.

Serial position effect is defined as "a tendency for the items near the beginning and end of the series to be recalled best, and those in the middle worst" (1). Serial position effect was coined in the 1910s by Hermann Ebbinghaus, a psychologist who also invented the learning curve. The implications of serial position effect for instruction is that the *opening and closing portions of the class* are just as important as the meat of your content.

So toss out that learning sandwich, and consider the churro.



The churro is a sugary fried donut item. It is delicious from first bite to last. Churros are long and cylindrical. Towards the middle of your eating experience it may be easy to lapse into a sucrose-sprinkled complacency and forget to appreciate the churro, but once down to the last bite, the churro will live on as a tasty memory. So let's consider instruction a churro, and openers and closers as your first and last bite. Fresh examples after the jump.

**The first bite: openers versus icebreakers.**

There is a distinction between an opener and an icebreaker. An icebreaker is designed to break tension, start conversations and get group members familiar with each other. For example, the game Two Truths and a Lie is considered an icebreaker. [UCSD Sixth College has a number of other examples<sup>27</sup>](#). Icebreakers are fun games, not necessarily tied into learning.

Openers, on the other hand, have three main characteristics very much tied into learning:

1. Openers break preoccupations of the learner and immediately involves the student in the content. Openers convey the message that passive learning is not allowed.
  2. Openers allow for sharing or networking and tap into prior knowledge of adult learners.
  3. Openers relate to the content, in order to show the value of the class from the very beginning.
- 3 opener examples:
- 1.3 & 1 – List 3 things you know about a topic, and one thing you want to learn.
  2. Think pair share – instructor poses a question (think), learners discuss with the person next to them (pair), everyone discusses as a group (share)
  3. Create curiosity – ask a provocative question, for example, ‘What are 3 ways you can get journal articles legally & for free?’
  4. Picture perfect: show 4 pictures, pose a question, then ask learners which photo they identify with the most

### The sweet and crunchy middle: keeping engaged

One thing our webinar did not discuss but is inherently useful in longer classes or seminars are “energizers.” Energizers are a method to increase engagement when classroom energy is low (for example: after lunch or a long chunk of content). Some easy examples from the Bob Pike Group are [3 breaths](#), [Silent Sit Down and Take a Vacation](#)<sup>28</sup>, but my favorite has to be [Frozen Acronyms](#)<sup>29</sup> (basically, vocabulary freezetag for webinars).

The last tasty morsel: closing with impact

Closers should keep students thinking even as the class is ending. In our webinar, we suggest that closers, content related activities for the end of class, have the following qualities:

A stands for Action and reflection – it asks: *What did I learn and how am I going to use what I learned?* An example we discussed in the webinar was from a 4 day PubMed course, where students were asked on the last day to list all the different features and facets of PubMed they would use and sort them into a toolkit.

R stands for Review and practice – an activity we discussed was [Concept Mapping](#)<sup>30</sup> (Check the link to ACRL’s Instruction Section for an overview) – the instructor creates a hierarchical map of the content presented and leaves some blank for the students to complete, OR, if more time is available, the students create a concept map from recall – [Bubble.us](#)<sup>31</sup> is an online brainstorming tool useful for mapping activities.

T stands for Tie things together – As Bob Pike [notes](#)<sup>32</sup>, *“this is not the instructor tying things together for the learner but rather the learner tying things together for him or herself.”*

An activity we discussed was Start Stop Stay – what will you start doing, stop doing, keep doing because of what you learned? We used an online interactive whiteboard tool called [Padlet](#)<sup>33</sup> to try out the activity. Padlet worked quite well as a tool for online group activities.

Openers and closers offer opportunities for reflective self assessment at the beginning and end of your class. They are a hook for teaching, and a way for learners to remember important concepts. Openers and closers can incorporate more thinking into the short time you have. Remember the churro.

## UDL for Teaching Face-to-Face and Online

Posted by [rkizilboga](#) on [March 5th, 2018](#)

Universal Design for Learning (UDL) is an approach to teaching and learning aiming at minimizing barriers to maximize learning. In order to achieve this goal, UDL helps educators to make curriculum understandable and accessible for everyone. UDL was first developed for the disabled people to make their access to the buildings easier. However, considering Neuroscience, UDL is an effective framework for teaching and learning as well. Because UDL offers guidelines that meet with the need of our brain’s network. These networks are 1) affective networks, which controls the ‘why of Learning’, 2) recognition networks, which controls the ‘what of learning’, and 3) strategic networks, which controls the ‘how of learning.’ UDL basically suggests using multiple means to promote teaching and learning.

- 1 Multiple means representation** stimulates the recognition networks and affects the what of learning. Therefore, teachers should support their instructions utilizing multiple ways of representation.
- 2 Multiple means of action and expression** excites the strategic network and support the how of learning. It is associated with allowing and encouraging learners to use multiple ways to reflect their learning.
- 3 Multiple means of engagement** is associated with the affective networks. By providing learners with multiple means of engagement, educators support the why of learning domain and might increase learner’s engagement.

According to a report released by the [National Center for Education Statistics](#)<sup>34</sup> (NCES) in 2013, 10.8% of the students in higher education in 2008 were disabled. Also, in another NCES report<sup>35</sup> in 2010, the percentages of the students based on their specific disabilities are showed in the Table 1.

**Table 1. Percentages of Students with Disabilities**

Disability	Percentages (%)
Learning disabilities	28
Mobility or orthopedic impairments	15.4
Health Impairments	5.8
Mental illness or emotional disabilities	24.1
Hearing impairments	6
Blindness and visual impairments	2.7
Speech or language impairments	0.7
Other impairments	17.3

One of the most important things to keep in mind is that UDL principles do not only suggest incorporating multiple technology options into lessons, but it also promotes utilizing multiple techniques or strategies. The choices of tools, methods, and strategies might differentiate based on the types of teaching. However, there are some general rules that should be followed by instructors especially when teaching online, such as color use with care, web-friendly font selection, use of bulleted points or numbered list, and use of headings and subheadings.

Appendices A and B shows how to design face-to-face and online teaching activities align with the UDL principles. The followings are the summaries.

### **Face-to-Face**

#### ***Multiple Means of Representation***

- Start your lesson with clear and measurable objectives
- Make the content accessible to the learners
- Give learners some time to familiarize with the goals and content
- Provide your learners with alternative format of your teaching
- Alternative text to images
- Closed captions for video materials

#### ***Examples***

- Lectures
- PowerPoint presentations
- Online presentation tools (Google slides, Nearpod)
- Handouts
- Printed materials
- Guest speakers
- Video and video materials

#### ***Multiple Means of Action and Expression***

- Clearly state the expectations from the learners
- Give learners some time to familiarize with the expectations
- Provide multiple options for students to showcase their understanding/learning.

- Make sure all the students have access to at least an option
- Provide support for learners when needed
- Allow students to be able to reflect their knowledge on various devices

#### ***Examples***

- Presentations
- Group and individual activities
- Twitter discussions
- Online meeting rooms (Todaysmeet)
- Bring Your Own Device (Laptop, Tablets, Smart Phone)
- Audio and video materials

#### ***Multiple Means of Engagement***

- Offer multiple fun activities to stimulate learners' interest.
- Increase learners' participation
- Allow students to be able to reflect their knowledge in a device that they feel comfortable with.

#### ***Examples***

- Bring Your Own Device
- Gamification
- Twitter

### **Online**

#### ***Multiple Means of Representation***

- Start your lesson with clear and measurable objectives
- Make the content accessible to the learners on various devices
- Give learners some time to familiarize with the goals and content
- Provide your learners with alternative format of your teaching
- Alternative text to images
- Closed captions for video materials

- Use color with care
- Record your teaching
- Clearly state contact information, technical requirements, prerequisites (if exists).

**Examples**

- PowerPoint presentations
- Online presentation tools (Google slides, Nearpod)
- Printable materials
- Guest speakers (Online)
- LMS (Moodle, Canvas, Desire2Learn, Blackboard)
- Video and audio materials
- Flipped classroom
- WebEx technologies
- Zoom, Skype

**Multiple Means of Action and Expression**

- Clearly state the expectations from the learners
- Give learners some time to familiarize with the expectations
- Provide multiple options for students to showcase their understanding/learning.
- Make sure all the students have access to at least an option
- Provide support for learners when needed
- Allow students to be able to reflect their knowledge either writing or speaking
- Provide clear guidelines for your learners how to submit assignments

**Examples**

- Twitter discussion or other discussion boards
- LMS (Moodle, Canvas, Desire2Learn, Blackboard)
- Online quiz

**Multiple Means of Engagement**

- Offer multiple fun activities to stimulate learners' interest.

- Increase learners' participation
- Allow students to be able to reflect their knowledge in a device that they feel comfortable with.

**Examples**

- Twitter discussion or other discussion boards
- Video or audio materials
- Group activities

**Useful links:**

<http://udlguidelines.cast.org/>

<http://www.cast.org/>

<http://www.udlcenter.org/>

## References

1. [Magma Indonesia Volcanoes Map](#)
2. [NLM Pillbox](#)
3. [MeSH on Demand Tool](#)
4. [MeSH on Demand Terms](#)
5. [Medical Subject Headings 2018](#)
6. [NLM Lister Hill National Center Biomedical Communications](#)
7. [Open Access Biomedical Image Search Engine](#)
8. [Medpix Online Database](#)
9. [Case Upload Server](#)
10. [Keeping up with Andragogy](#)
11. [Overcoming the Motivation Challenge in eLearning](#)
12. [Four Ways to Make Interactivity Count](#)
13. [10 Pros and Cons of a Flipped Classroom](#)
14. [Why You Need to Use Storytelling for Learning](#)
15. [Intro to Storytelling for Instructional Designers](#)
16. [How to Use the New Q&A and Laser Pointer](#)
17. [Section 508 at the U.S. Department of Health and Human Services](#)
18. [Cheatsheets at the National Center on Disability and Access to Education](#)
19. [Web Accessibility Evaluation Tool Browser Extension](#)
20. [Accessibility Developer Tools](#)
21. [Adobe Accessibility Training](#)
22. [Federal Social Media Accessibility Toolkit Hackpad](#)
23. [GSA Government-wide Section 508 Accessibility Program](#)

24. [Vocational Rehabilitation and Other Rehabilitation Services](#)
25. [Section 508: The Law](#)
26. [NNLM Training Office \(NTO\)](#)
27. [Icebreakers, Team Building Activities, and Energizers](#)
28. [Three Energizers to Keep Participants Engaged](#)
29. [Frozen Acronyms: Online Opener, Revisiter, Energizer](#)
30. [Mind and Concept Mapping](#)
31. [A Brainstorming Tool: Bubble](#)
32. [Asked and Answered: Openers and Closers](#)
33. [An Online Collaboration Tool: Padlet](#)
34. [U.S. Department of Education, National Center for Education Statistics \(2016\). Digest of Education Statistics, 2015 \(2016-014\), Chapter 3](#)
35. [Profile of Undergraduate Students: 2007-2008](#)