

Spring 5-13-2016

# How Do Teachers Overcome the Perceived Barriers of Using the Universal Design for Learning?

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# How Do Teachers Overcome the Perceived Barriers of Using Universal Design for Learning?

Christina Anne Martin

May 13, 2016

How do Teachers Overcome the Perceived Barriers of Using Universal Design for  
Learning?

By

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B.S., University of Georgia

A Capstone Submitted to Graduate Faculty  
of Georgia State University in Partial Fulfillment  
of the  
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA

30303

APPROVAL PAGE

How do Teachers Overcome the Perceived Barriers of Using Universal Design for Learning?

by

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## Acknowledgements

I would like to thank the faculty of Georgia State University for their guidance and assistance. I would especially like to thank, Dr. Emily Graybill and Dr. Daniel Crimmins. I am very grateful for the support of my parents, sister, and boyfriend through my experience as a Public Health Graduate Student.

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Christina Anne Martin

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## **Abstract**

Universal Design for Learning (UDL) is an approach to teaching that recognizes diversity of learning styles and response preferences. It is offered as an alternative to the “one-size-fits-all” instructional methods. With UDL, classrooms offer multiple methods of presenting information, intended to resonate with different information processing styles, and also allowing for varied response modalities. The use of UDL is growing in classrooms across the United States.

With an increasing emphasis on UDL implementations, there is an increased recognition of teachers’ concerns and perceived barriers to its use in their classrooms. This paper reviews different strategies to implement UDL. It has been created from different resources including videos, websites, journal articles, and feedback from current teachers. This paper suggests different ways that teachers can overcome the perceived barriers of using UDL, with specific consideration given to time, knowledge, finances, and training that were identified as the key barriers when applying UDL. As UDL proves to be efficient and beneficial for students, offering them the opportunity to reach their full potential, it will be increasingly important to provide support for their incorporation into learning environment.

## **Introduction**

The world is made up of many people, all of whom are unique in their own way. Two people can be similar to one another, but no two people are identical in every way. A universal design creates a universally accessible learning environment. By definition, the word “universal” is defined as used and understood by everyone (Making sense, 2015). Design is defined as a creation of a plan. A universal design is a plan that is used and understood by everyone. A universally designed building accommodates everyone. A building that is universally designed contains automatic doors, ramps, elevators, and more accommodations (Making sense, 2015). Anyone is able to access the building. Is a learning environment accessible for all students?

Universal Design for Learning (UDL) is a framework that addresses the divergent learning needs of students and assists in developing curricula. UDL recognizes that there is variability in learning. The application of UDL is limited, but it is growing (Smith, 2012).

While the use of UDL is gaining momentum, perceived barriers to using a UDL framework do exist. When implemented correctly, UDL motivates all students to be engaged, increases learning, and provides full access to content. It is stated that UDL is capable of eliminating “barriers to learning that students may encounter” (Lieberman, Lytle, & Clarq, 2008). While UDL eliminates learning barriers for students, teachers being asked to implement UDL identify barriers as they attempt to use it in classrooms. This paper will provide specific examples of both the perceived barriers to implementing UDL and strategies educators use to overcome them to increase maximum student engagement.

## **Description**

### **Origin**

Before the barriers using UDL are described, this paper will provide background on UDL. In the early 1990s, neuropsychologist, educator, and author, David Rose and a team, developed the UDL framework to improve and optimize learning for students by emphasizing multiple representations of materials (Smith, 2012). UDL grew out of a broader framework of universal design, which emphasizes the idea of environments that are accessible or accommodating to all regardless of ability. UDL extends this idea to the learning environment.

For example, to meet the needs of students who are visual learners, teachers would ensure that all lessons include visual aids for students to connect to the information they are learning. Different visual aids may include posters and pictures, so that first grade students may associate pictures of animals to what country the animal is from. Another form of learning is kinesthetic learning. The students learn through carrying out physical activity. Kinesthetic learners use participatory action, which assists a student in understanding the relationship between participation and action. For example, reflections are made on the exercises done in class, which provides students with the opportunity to express their opinions to improve learning.

The UDL framework helps create more opportunities for students to learn efficiently. UDL creates efficiency because by using a range of strategies that work all students, teachers will ideally have at least one method that is working for every student. UDL enhances academic success and helps educators have more time and resources to support every student.

## **Using UDL**

UDL is based on the premise that there is no average learner. Everyone learns differently. Traditionally students' scores are placed on a bell curve and then one determines how close the student is to the average score based on the standard deviation (Stein, 2014). Researchers question whether it is necessary to focus on a specific average. For those below the "average," modifications for those students may or may not be made. Todd Rose, the co-founder and president of The Center for Individual Opportunity, describes some concerns with assuming most people are average (Myth of Average, 2013).

An example from the U.S. Air Force illustrates a major problem with the concept of "average." Early designs of airplane cockpits used "averages" in height, weight, and reach to determine the placement of instruments. Yet these "average" cockpits did not always accommodate every pilot. Each pilot had different physical characteristics such as weight and height; they also had different levels of skill. A very experienced pilot might have needed a cockpit with additional functions (Myth of Average, 2013). In order to increase efficiency, the Air Force began to create cockpits that accommodate the pilot.

Similar to the cockpits for the Air Force, different options can be offered in an academic learning environment. Imagine the classroom desk as the cockpit. The students need learning variability. Learning variability is slowly becoming the norm in classrooms today as we are beginning to recognize that students vary in "abilities, preferences, cultures, languages, and experiences, all of which affect how they learn" (Hartman, 2015). Even though the myth of the average learner is still pervasive, UDL is a model that can help educators support all students regardless of how the students learn.

## UDL Principles

**Multiple Means of Representation.** The first principle is *Multiple Means of Representation*. From this principle, educators can create more information for learning options. It offers different ways to provide students with content knowledge. *Multiple Means of Representations* means that the same information is represented in different formats such as PowerPoints, lectures, or hands-on activities (Smith, 2012). Because learners vary widely in their learning experiences, providing different representations assists in creating the universal environment for learners (Smith, 2012). This guideline encourages educators to provide options for perception, language, mathematical expressions, and symbols, and options for comprehension (Smith, 2012). For example, one student may watch a presentation given by the teacher while another sits alone and listens to an audiotape covering the same content using headphones.

Each principle has specific guidelines that structure the principle. Within each guideline, there are specific checkpoints. In order to provide more detail, the principles are broken down into guidelines and then the checkpoints. *Means of Representation* consists of three guidelines: provide options for perception, for language, mathematical expressions, and symbols, and for comprehension. Table 1 displays how the checkpoints are broken down within each guideline and examples.

**Table 1: Multiple Means of Representations Guidelines and Checkpoints**

<b>Guideline</b>	<b>Checkpoint</b>	<b>Example</b>
Provide options for perception	Offer ways of customizing the display of information	Effective color contrast
	Offer alternatives for auditory information	Described and Captioned Media Program
	Offer alternatives for visual information	Art Beyond Sight
Provide options for language, mathematical expressions, and symbols	Clarify vocabulary and symbols	Word Generation
	Clarify syntax and structure	Interactive: Elements of a Story
	Support decoding text, mathematical notation, and symbols	Mathematics Glossary
	Promote understanding across languages	Capita Translations
	Illustrate through multiple media	Search Cube
Provide options for comprehension	Activate or supply background knowledge	Digging for Answers
	Highlight patterns, critical features, big ideas, and relationships	Readability
	Guide information processing, visualization, and manipulation	Read With me eBooks
	Maximize transfer and generalization	CueCard

Source: <http://www.udlcenter.org/aboutudl/udlguidelines/principle1>

**Multiple Means of Action and Expression.** The next principle, *Action and Expression*, relates to how educators understand the learner’s capabilities, preferences, and approaches--these three constructs are described below. Students are provided with “alternatives for demonstrating what they know” (Kraglund-Gautheier, 2014). *Action and Expression* encourages teachers to be mindful and aware of the differences that students possess and then reveal the appropriate learning styles for each student (Smith, 2012). This guideline is built on the framework where students are able to demonstrate what

they know in different ways. In order to have *Means of Action and Expression*, classrooms must provide ranges of capabilities, preferences, and approaches (Smith, 2012). One student may be capable of writing very well to demonstrate knowledge while another may verbally display what they know. Providing a wide range of approaches enables students to express themselves in ways that align with their strength.

*Action and Expression* also consists of guidelines and checkpoints. The guidelines include providing options for physical action, for expression and communication, and for executive functions. Table 2 lists the structure of the principle, *Action and Expression*.

**Table 2: Multiple Means of Action and Expression Guidelines and Checkpoints**

<b>Guideline</b>	<b>Checkpoint</b>	<b>Example</b>
Provide options for physical action	Vary the methods for response and navigation	Camera Mouse
	Optimize access to tools and assistive technologies	Switch Scanning Methods
Provide options for expression and communication	Use multiple media for communication	Animoto
	Use multiple tools for construction and composition	Math calculators and tools
	Build fluencies with graduated levels of support for practice and performance	Book Builder
Provide options for executive functions	Guide appropriate goal-setting	Goal Setting Worksheets
	Support planning and strategy development	Assignment Calculator
	Facilitate managing information and resources	The Learning Toolbox
	Enhance capacity for monitoring progress	Create-a-Graph

Source: <http://www.udlcenter.org/aboutudl/udlguidelines/principle2>

**Multiple Means of Engagement.** *Multiple Means of Engagement* is the final principle from the UDL framework. This principle encourages allowing learners to

monitor their learning progress, to adjust accordingly, and then to determine the most effective learning experience (Smith, 2012). Similar to a connection with a hobby, students have the opportunity to feel emotionally connected to their learning environments. This principle allows learning to be more meaningful to them. Once the learning becomes more meaningful, a student’s motivation level may increase. Teachers are encouraged to evaluate all learning areas and offer multiple opportunities, so learners can feel a strong connection to the learning experience.

*Means of Engagement* consists of three guidelines: options for recruiting interest, for sustaining effort and persistence, and for self-regulation. Table 3 provides information on the guidelines and checkpoints. From the examples listed, students have a greater connection with the material they are learning. They can set goals and become more engaged with what they are learning. Students are able to reflect on what they are learning and decide how they can improve themselves.

**Table 3: Multiple Means of Engagement Guidelines and Checkpoints**

<b>Guideline</b>	<b>Checkpoint</b>	<b>Example</b>
Provide options for recruiting interest	Optimize individual choice and autonomy	Book Adventure
	Optimize relevance, value, and authenticity	NBC Learn
	Minimize threats and distractions	Pace Car
Provide options for self-regulation	Promote expectations and beliefs that optimize motivation	Setting Goals with Students
	Facilitate personal coping skills and strategies	Faces of Learning
	Develop self-assessment and reflection	Learner Diaries
Provide options sustaining effort and persistence	Heighten salience of goals and objectives	Technology’s Rubric Maker
	Vary demands and resources to optimize	Exploring Language



	challenge	
	Foster collaboration and communication	Skype
	Increase mastery-oriented feedback	Mindset

Source: <http://www.udlcenter.org/aboutudl/udlguidelines/principle3>

## **Implementing UDL**

### **Perceived Barriers**

When implementing UDL, different barriers are perceived pertaining to training, time, lack of engagement, and money. To start, training is considered. One potential barrier to *Multiple Means of Representation*, for example, is access to tools and assistive technologies. Before the students can use the tools, the teachers may have to familiarize themselves with how to utilize the tools and then teach the students. From there, students are then able to access those resources. With proper training, teachers can implement these strategies, however, that training is not always available.

When beginning the implementation of UDL, teachers can be challenged with how to change their old teaching techniques to the new ones; this can be perceived as another barrier. Finally, teachers may need additional support developing accommodations for children with learning disabilities. Similarly, students with an accelerated learning speed may need different accommodations. Training serves a key contribution to success when implementing UDL.

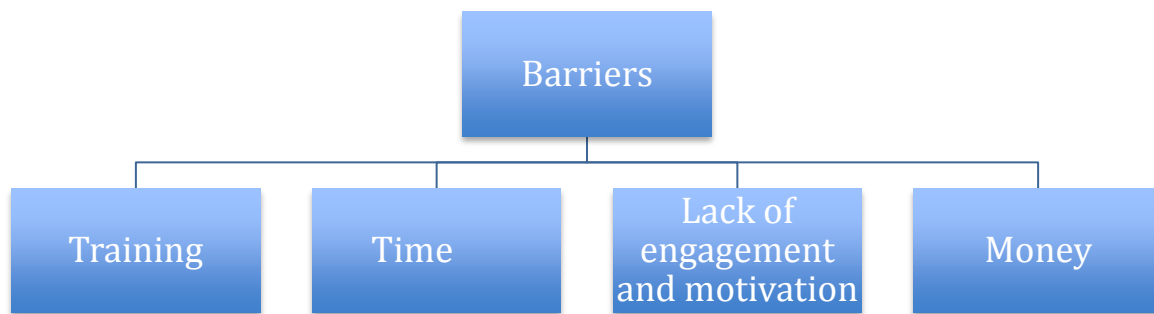
Another perceived barrier is how to keep students engaged and motivated in the learning environment. This relates to how well a teacher knows his or her student. This applies to how a teacher may have to accommodate a learning environment based on the background of each student. Implementing different strategies when a student does not

understand may be another barrier. Students are more willing to express themselves if there is a connection among the material, the learning environment, and the student. Barriers to implementing the principle, *Means of Engagement*, relate to keeping students engaged and motivated. Ultimately, students need to reach their full potential, however students may not understand the purpose of the lesson. Another barrier that this principle addresses is the idea that students need to be consistently motivated. Students are very diverse in the classroom, and one barrier may be that teachers want to ensure that their students have meaningful access to the curricula. The assignments may not have value in the students' lives. To encourage engagement, teachers can optimize individual choice and autonomy. Teachers may struggle with keeping students on task when the instruction is not relevant or engaging to the students, but the UDL framework provides some guidance on how to reduce that struggle. Using different forms of media to present the same content and customizing learning pertaining to a student's interests encourages engagement and motivation. Again, when a student feels a connection to the content, he or she may learn more from being more motivated. Finally, students are likely to be more engaged in a subject when teachers track mastery of the topic and provide regular feedback to the student.

Money may be also viewed as a barrier. Teachers may feel that they don't have the finances to support implementing UDL, even though many of the resources that exist though are free of charge. Many companies and online programs are free of charge to use. Once teachers are able to learn how to use the different resources, applying the resources into the classroom may be more affordable than perceived.

The chart below provides a visual of the different perceived barriers a teacher may have when implementing UDL.

**Chart 1: Perceived Barriers Flow Chart**



**Resource List For Perceived Barriers**

Many different perceived barriers exist. Provided is a list of resources pertaining to the barriers.

1. Offer Different types of demonstrations in a classroom
  - a. The National Center on Universal Design for Learning provides many examples on how to implement UDL
    - i. CAST is one of the organizations that discusses the implementation of UDL and creating different types of representations

1. Source:

<https://www.youtube.com/watch?v=KuTJJQWnMaQ>

- ii. Effective Color Contrast is customizing the display of information so that it is accessible to a broader range of users
- iii. Read with Me eBooks help with information processing by providing techniques to learn to read, and they Offer different resources to help children learn how to read helps children's skills develop

1. Source: <http://readwithme.cast.org/>

2. Offer students access to information in different representations

a. CAST discusses different ways to be flexible in a learning environment

i. Source: <https://www.youtube.com/watch?v=pGLTJw0GSxk>

3. CAST discuss how teachers can master applying the UDL principles and guidelines to their curricula

i. Source: <https://www.youtube.com/watch?v=zE8N8bnIlgs>

4. Different displays of information are customized in UDL

a. Elementary school teachers create music videos to help children learn different topics in school and then apply the melody of the song to learn new lyrics

i. Source:

<https://www.youtube.com/watch?v=QvsQuiy4UZA&feature=youtu.be>

5. Accommodations are made according to the different rates that students learn

a. CAST examines different classrooms and how they utilize UDL to accommodate different learning rates

i. Source: <https://www.youtube.com/watch?v=dTxFYf50l-4>

ii. Source: <https://www.youtube.com/watch?v=zE8N8bnllgs>

## 6. CAST

a. This is a nonprofit education research and development organization that works to expand learning opportunities using UDL

i. Source: <http://www.cast.org/about#.VseysnQrIlg>

## How to Address the Barriers

Now that implementing UDL and potential barriers have been discussed, it is now time to present different examples of how to address each barrier. Listed below are three charts describing different examples of how teachers can overcome barriers. Resources are included to assist teachers. The charts are divided by each principle. The potential barriers fall in each principle; however each barrier relates to the principles in different ways. These charts serve as a resource to educators to assist them in implementing UDL.

**Chart 2: Multiple Means of Representation**

Barrier	How to address the barrier	Examples
Lack of engagement and motivation	Use different media to present the same content customized to the children’s interests	<ul style="list-style-type: none"> <li>• Tests with multiple choice, true and false, short essay, group tests, Extra Credit, Projects (What accommodations do we make to honor all learning needs) <b>Source: (C.S., personal communication, February 10, 2016)</b></li> <li>• Offer different resources such as books, visuals, handouts, podcasts, newspapers, so there is a different representation of the same material, such as learning about economics (e.g. news articles, debates, documentaries, etc).</li> <li>• When teaching a new lesson, a teacher can present it in three different ways. For example, in math use physical objects to add and subtract. Then have students do written problems. Finally have the students create their own problem. <b>Source: <a href="https://www.youtube.com/watch?v=KuTJJQWnMaQ">https://www.youtube.com/watch?v=KuTJJQWnMaQ</a></b></li> <li>• Effective color contrast serves as a way to display information differently. Teachers can learn how to customize displays of information for individuals with visual impairments. Flexibility of color and contrast is a great example of customizing the display of information so that it is</li> </ul>

		<p>accessible to a broader range of users. For example, a PowerPoint with a light red and black is more effective for learners while red and green is not as effective. You want to catch the learner's attention.</p> <p><b>Source:</b>  <a href="http://www.udlcenter.org/implementation/examples/examples1_1">http://www.udlcenter.org/implementation/examples/examples1_1</a></p> <ul style="list-style-type: none"> <li>• Children learn how to read differently. Offering different resources for learning to read helps children's skills develop. Read with Me eBooks helps with information processing by providing different techniques to learn to read. They are interactive books that teachers and students can use together.  <b>Source:</b> <a href="http://readwithme.cast.org/">http://readwithme.cast.org/</a></li> <li>• How do children best learn vocabulary? Offer different activities such as picture clues, fill in the blank exercises, listening activities, game playing, and expanded reading days that all pertain the vocabulary words of the week. A word wall could also be created however students have the control over how the wall is created and organized based on their learning abilities.  <b>Source: (Novak, 2014)</b></li> <li>• Song is a great way for children to learn. The song gets in the children's heads and sticks. For example, when learning to add use a song they are familiar with such as Taylor Swift's <i>Shake it Off</i> and replace the words. Have the students repeat the lyrics and apply the lyrics when writing the math problems on the board.  <b>Source: (M.Y., personal communication, February 10, 2016)</b>  <b>Source:</b>  <a href="https://www.youtube.com/watch?v=QvsQuiy4UZA&amp;feature=youtu.be">https://www.youtube.com/watch?v=QvsQuiy4UZA&amp;feature=youtu.be</a></li> <li>• Students may struggle when understanding elements of literature. They may interpret different parts of a story differently. Interactives: Elements of a Story is a good source to use to assist children. This is a website that does interactive stories. A voice is used to help assist children when learning how to read. It is a great tool to specify to children's interests.  <b>Source:</b> <a href="http://www.learner.org/interactives/story/">http://www.learner.org/interactives/story/</a></li> <li>• Allow choices and different paths for students. Be flexible with the learning environment from the beginning. Assist in offering different learning representations. For example, if a student prefers to read to find knowledge, offer different types of books. Also, provide tablets and computers.</li> </ul>
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		<p><b>Source:</b> <a href="https://www.youtube.com/watch?v=pGLTJw0GSxk">https://www.youtube.com/watch?v=pGLTJw0GSxk</a></p>
Training	Teaching techniques may be adjusted according to learning preferences	<ul style="list-style-type: none"> <li>Always provide options for comprehension (Provide or activate background knowledge). When teaching students about creating poems, correlate the class spelling words to creating poems. Encourage the students to use words they already know and the definition. Some students may not have any understanding of poetry. This will support memory and transfer. Students can then highlight critical features, big ideas, and relationships in the lesson.</li> </ul> <p><b>Source:</b> <a href="https://www.youtube.com/watch?v=zE8N8bnllgs">https://www.youtube.com/watch?v=zE8N8bnllgs</a></p>
Time	Consider the time that must be taken into consideration when teaching the same content in four different ways	<ul style="list-style-type: none"> <li>Learning stations would be a great way to offer different forms of learning. For example, in a second grade class that is learning grammar, one station is a bunch of cards that needed to be sorted into different categories such as noun and verb. At the next station, the students had to create a sentence using the noun and verb from the first station. This allows the students to build at each student and finally they present what they have learned to the class.</li> </ul> <p><b>Source:</b> (M.Y., personal communication, February 10, 2016)</p>



**Chart 3: Multiple Means of Action and Expression**

Barrier	How to address the barriers	Examples
Training	Provide accommodations that are made according to the different rates students learn	<ul style="list-style-type: none"> <li>• In a math class is that learning fractions and one child needs more time to learn the lesson. An additional teacher assists the students and spends additional time. The additional teacher can either take the student to a separate space or work with the student as the lesson continues. More and more classrooms use another teacher to help in situations like this. <b>Source:</b> <a href="https://www.youtube.com/watch?v=KuTJJQWnMaQ">https://www.youtube.com/watch?v=KuTJJQWnMaQ</a></li> <li>• Another example involves a science class. A class is learning about measuring grams of sugar. They have to do basic math to start the problems. Instead of doing the work on paper, a calculator is provided to assist students. The calculator especially helps students that may struggle with basic math. This provides options for expressive skills and fluency by providing tools for composition and problem solving. <b>Source:</b> <a href="https://www.youtube.com/watch?v=dTxFYf50l-4">https://www.youtube.com/watch?v=dTxFYf50l-4</a></li> <li>• Scaffold learning can assist with the different speeds of learning. Scaffolding is a teaching method that enables a student to solve a problem, carry out a task, or achieve a goal through a gradual shedding of outside assistance. For example, a class may be learning about a president. The first assignment is to research a president and tell the class why they have picked that president. Then each week, the students will have weekly summaries about the chosen president (summaries include childhood, life before being president, time as president, personal life, and death if applicable). Each summary will contribute to a final paper written about the president. <b>Source:</b> <a href="https://www.youtube.com/watch?v=zE8N8bnllgs">https://www.youtube.com/watch?v=zE8N8bnllgs</a></li> </ul>
	Offer strategies to assist students when they do not understand some of the material	<ul style="list-style-type: none"> <li>• Also provide options for executive functions (Facilitate managing information and resources and support planning and strategy. development). Let students make their own decisions. For example, in a literature class, a student may not understand a word in the story. Allow the student to figure out how to get the meaning. The student could use a dictionary, a thesaurus, the Internet or another student. <b>Source:</b> <a href="https://www.youtube.com/watch?v=zE8N8bnllgs">https://www.youtube.com/watch?v=zE8N8bnllgs</a></li> <li>• Students can set new goals such as learn a new word each day. Goal setting encourages a student to learn new material . <b>Source:</b> <a href="https://www.youtube.com/watch?v=zE8N8bnllgs">https://www.youtube.com/watch?v=zE8N8bnllgs</a></li> <li>• Students struggle with math in different ways. Math Calculators and Tools is a great resource to assist children in learning mathematic and financial equations. Calculators are a tool to provide options for students to problem solve math. <b>Source:</b> <a href="http://www.math.com/students/tools.html">http://www.math.com/students/tools.html</a></li> <li>• Create board games so children can express their knowledge of content. The students create the game</li> </ul>

		and then demonstrate how to play. To review for a test, this would be a great study tool <b>Source: (Novak, 2014)</b>
Training	Offer access to tools and assistive technologies	<ul style="list-style-type: none"> <li>To optimize access to tools and assistive technologies, teachers can invest in camera mouse. This is a free program that enables you to control the mouse pointer on your computer screen just by moving your head. Students do not have to use their hands to navigate a computer. <b>Source: <a href="http://www.cameramouse.org/">http://www.cameramouse.org/</a></b></li> <li>Students have the opportunity to meet goals and plan their actions strategically. Writing essays and reports can be a struggle. Assignment calculator serves as a great tool to allow students to create a time management guide for writing assignments. <b>Source: <a href="https://rpc.elm4you.org/">https://rpc.elm4you.org/</a></b></li> </ul>
Lack of Engagement and Motivation	Ensure that students express themselves individually	<ul style="list-style-type: none"> <li>A kindergarten student does not communicate well and cannot express him or herself verbally. The teacher can encourage the student to improve writing and reading so the student can express him or herself through writing words instead of speaking. Also a student could paint or draw. For example, when learning about the Rainforest, a student could draw out all the components of the Rainforest to express what they know. <b>Source: (K.O., personal communication, February 7, 2016)</b></li> <li>Offer choice assignments. For example, artistic students will love to create graphic novels or comic strips that examine the content being studied. Political cartoons are another form to express political opinions but through art. Another example is instead of making just a standard poster, offer a variety of materials like crayons, markers, colored pencils, glitter, glue, and construction paper. Students can have the opportunity to express themselves. Prezi is a great program students can use to create presentations instead of using standard PowerPoint. This program is free and easy for students to learn how to use <b>Source: (Novak, 2014)</b></li> </ul>
	Provide accommodations that need to be made for children with learning disabilities	<ul style="list-style-type: none"> <li>For a student who is learning at a more accelerated speed and may appear bored in the average learning environment, offer a task that allows them to demonstrate what they know in a more accelerated way. For example, a classroom has a faster paced student and a student with autism. They are learning about the solar system. Allow the faster paced student to partner up with the student with autism, so he or she can teach. Allowing the student to demonstrate their knowledge to another student boosts confidence. <b>Source: <a href="https://www.youtube.com/watch?v=pGLTJw0GSxk">https://www.youtube.com/watch?v=pGLTJw0GSxk</a></b></li> </ul>
Time	Allow time for teachers to learn about their students	<ul style="list-style-type: none"> <li>Take time at the beginning of school year to learn strengths and weaknesses of the students. If a student cannot demonstrate the material due to not understanding English, offer a certified translator.</li> <li>In order to assist students to express themselves individually, allow the student to collect their own data. For example, for a science problem, let them use themselves for the data. Students are learning about measuring sugar. Students use labels from their lunch boxes to see how much sugar they are</li> </ul>

		<p>consuming on a daily basis. This encourages students to put themselves in the lesson. <b>Source:</b> <a href="https://www.youtube.com/watch?v=dTxFYf50l-4">https://www.youtube.com/watch?v=dTxFYf50l-4</a></p> <ul style="list-style-type: none"><li>• It benefits teachers to know their students because they learn about different quirks that help students excel. For example, some students strive to have more physical action when learning, the teacher learns this from the beginning. Cue Mouse is a great example of how to increase physical action in learning. The student controls the mouse pointer with his or her head instead of a hand. This is perfect for providing options for physical response. <b>Source:</b> <a href="http://www.cameramouse.org/">http://www.cameramouse.org/</a></li><li>• Use student feedback to inform instruction. Students can help guide a teacher's curriculum based on their feedback <b>Source:</b> (Novak, 2014)</li></ul>
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**Chart 4: Multiple Means of Engagement**

Barrier	How to address the barriers	Examples
Lack of Engagement and Motivation	Students need to reach their full potential	<ul style="list-style-type: none"> <li>Students can have the opportunity to reach their full potential by having complete decision-making. An example would be inviting students to “be the character” from a book and come to class in character. They pick a character from a favorite book and come to class and the classmates ask questions about the character to learn. This would require a good amount of preparation but children would enjoy educating the class on some they chose to present on. <b>Source: (Novak, 2014)</b></li> </ul>
	Offer ways for students to reflect	<ul style="list-style-type: none"> <li>Allow student to reflect and show what they have learned- final presentations are great way to show this. Final presentation is of the student's choosing based on learning preferences. <b>Source: (C.S., personal communication, January 29, 2016)</b></li> <li>In a second grade classroom, hiding task cards and allowing the children to solve the problem keeps them motivated to learn while having fun <b>Source: (M.Y., personal communication, February 11, 2016)</b></li> <li>“If a participant seems shy, unwilling to participate, clings to a chaperone, or seems otherwise an “outsider” to the group, I test the waters by asking the participant a question during the group activity. If he or she seems receptive to participating, I might decide to have him be my “special materials helper” for the night. One-on-one attention often brings these learners out of their shells, and they’re more likely to join in group activities” and become motivated. <b>Source: (Meyer, Rose, &amp; Gordon, 2014)</b></li> </ul>
	Teachers optimize individual choice and autonomy	<ul style="list-style-type: none"> <li>Teacher provides additional resources. For example, if the student prefers to read in order to learn, then the teach offers additional reading that the student shows interests on. Students have the choice of how they want to learn based on the choices. This increases individualism. <b>Source: <a href="https://www.youtube.com/watch?v=pGLTJw0GSxk">https://www.youtube.com/watch?v=pGLTJw0GSxk</a></b></li> <li>Provide options for recruiting interest (Enhance relevance, value, and authenticity). This will also increase autonomy. For example, a class is learning about measuring grams of sugar. The students use real</li> </ul>

		<p>sugar used in their favorite cereal to measure as well as look at nutrition labels and fact sheets. Relating to autonomy, when students do group work, allow the students to have different roles to contribute to the work. The roles will specifically relate to the student's learning preferences. Make the roles fun. This engages the students more and they can make their own choices. Roles in a group project include the discussion director. This person delegates the tasks and leads the group. Another role is the summarizer. This person creates the different sections of the project that will be presented to the class. Another role is the connector. The connector ties all the different sections together and how the sections relate. Another role depending on the project is the artful artist. The artist adds the creativity to the project. One more role is a word wizard. The word wizard makes sure all the content flows and makes sense. Each of these roles can help strengthen a student. The roles specific what the student does well in.</p> <p><b>Source:</b> <a href="https://www.youtube.com/watch?v=zE8N8bnIlgs">https://www.youtube.com/watch?v=zE8N8bnIlgs</a>  <b>Source:</b> <a href="https://www.youtube.com/watch?v=dTxFYf50l-4">https://www.youtube.com/watch?v=dTxFYf50l-4</a></p> <ul style="list-style-type: none"> <li>• To optimize individual choice and autonomy, teachers can join Book Adventure. This is a free reading motivation program for children in grades K-8. Children can choose from over 7,000 recommended titles and create their own book lists. Because children have a choice, they are able to have a meaningful connection with the program and love to read more. Students become more engaged in reading when they are given the free choice to choose what they want to read.  <b>Source:</b> <a href="http://www.udlcenter.org/implementation/examples/examples7_1">http://www.udlcenter.org/implementation/examples/examples7_1</a></li> <li>• Students need to see themselves as individuals with individual needs and abilities and to develop a one-to-one relationship even when in large classroom settings. A teacher with a larger classroom may use Learner Diaries as a resource to encourage students to self-reflect and assess their learning.  <b>Source:</b> <a href="http://www.teachingenglish.org.uk/article/learner-diaries">http://www.teachingenglish.org.uk/article/learner-diaries</a></li> </ul>
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Lack of engagement and motivation	Help keep students on task when the instruction is not relevant or engaging to them	<ul style="list-style-type: none"> <li>• For assessment, a tic-tac-toe board is used where there are 9 approved options and students are required to pick 3 in a row (these are leveled so more advanced students can be challenged) and then students show their mastery of the subject. Students relate to the level that best suits them. If the level is too hard, the student may become disengaged from the assessment process. <b>Source: (M.Y., personal communication, February 10, 2016)</b></li> <li>• “If a participant seems disengaged, bored, distracted, or distracting to others, I might go stand or sit near that participant. If he or she is off task, usually just my presence puts he or she back on track. If he or she is bored, I might ask some quiet questions or point out something interesting about the activity that I have not told the whole group. Disengagement can be a symptom of something else- fear of the unexpected, discomfort with new situations, shyness, or fear that he or she will seem stupid.” Offering individual attention can reduce anxiety and can keep a student more focused. <b>Source: (Meyer, Rose, &amp; Gordon, 2014)</b></li> </ul>
Training	Teachers ensure that students have meaningful access to curriculum when the students are so diverse	<ul style="list-style-type: none"> <li>• Provide options for sustaining effort and persistence (Foster collaboration and communication). This allows options that vary levels of challenge and support. Students are encouraged to find material in the curriculum that is challenging for them but differs from student to student. <b>Source: <a href="https://www.youtube.com/watch?v=dTxFYf50l-4">https://www.youtube.com/watch?v=dTxFYf50l-4</a></b></li> </ul>
	Assist tracking mastery of a topic when comparing different learning styles	<ul style="list-style-type: none"> <li>• For assessment, a tic-tac-toe board is used where there are 9 approved options and students are required to pick 3 in a row (these are leveled so more advanced students can be challenged) and then students show their mastery of the subject. Students relate to the level that best suits them. If the level is too hard, the student may become disengaged from the assessment process. <b>Source: (M.Y., personal communication, February 10, 2016)</b></li> <li>• Students all have different levels of interest. For example, students may have different interests in language. Exploring Language allows students to choose a level that is best for them to learn about a specific language. <b>Source: <a href="http://www.learnalberta.ca/content/elsel/html/index.html">http://www.learnalberta.ca/content/elsel/html/index.html</a></b></li> </ul>

## **Strengths**

UDL offers many methods of helpful teaching methods. Each principle identifies considerations for ensuring that all students reach their potential. Even though the application of UDL is limited, it is growing (Smith, 2012). UDL has many benefits and strengths. The benefits include motivation of students to participate, increased engagement of all students in activities, management time is reduced for teachers, learning increases, full access to content is provided, and less frustration exists for teachers and learners (Lieberman et al, 2008). Teachers do face barriers, but they can be overcome. UDL is also capable of eliminating “barriers to learning that students may encounter” (Lieberman et al, 2008). A major strength of UDL is that it provides a more efficient way for students to learn due to students having increased access to the curriculum (Lieberman et al, 2008). Teachers can benefit from using UDL because the activities implemented from UDL addressed the needs of a range of students. This results in ensuring that all objectives for students are considered. Students are able to reach their full potential.

## **Conclusion**

UDL accommodates the different preferences of diverse learners. UDL is implemented in many different curricula to create opportunities to engage *all* students. Built from the three principles, UDL supports reaching all students’ potential. However barriers do exist when implementing UDL, especially from a teacher’s viewpoint. The purpose of this paper was to provide specific examples on how educators can overcome any perceived barriers when implementing UDL. Educators may face the barriers of lack

of training, time, engagement and motivation, and money. Resources are provided to assist educators and teachers. UDL aims to assist students in reaching their full potential. Examples and resources from this paper may provide guidance to teachers when working with diverse groups of learners.



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