

Universal Design for Learning in a Technical English classroom

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ABSTRACT: *The “super-diversity” of our current educational scenario has shaped the classroom in a way that educators need to take into consideration when teaching, different ethnic, racial, cultural, and socioeconomic backgrounds, as well as physical and learning disabilities. The role of the FL teacher has evolved to teach in a way that can meet the needs of all learners. To accomplish that, teachers need to have a flexible teaching approach, providing a lesson with several classroom materials, so that all students will have the best academic outcome. A powerful approach for teachers to use is Universal Design for Learning (UDL) in a Technical English environment, which is a framework that uses science-based instruction to improve the learning experience, built on how humans learn, and helps teachers design learning experiences that meet the needs of all students. By removing the barriers to learning and giving all students equal opportunity to succeed, UDL is a method that meets the necessity of teachers in the 21st century, of giving a sense of belonging to students in a more inclusive and diverse classroom.*

KEYWORDS: *Educational scenario, principles, strategies, Technical English, Universal Design .*

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I. INTRODUCTION

One of the key factors in helping globalization of education is acknowledging diversity to create a universal design for learning that reaches every individual across the globe. According to Thibodeau (2021), “two scientists Dr. David Rose and Dr. Anne Meyer, in 1984, incorporated CAST (Center for Applied Special Technology) whose goal was to revolutionise the way special needs students were taught by introducing technology that would allow students and teachers to customise their learning experiences”.

UDL closely works with Bloom’s Taxonomy, which helps define and distinguish different levels of human cognition. It uses the different networks of the human brain - Affective Networks (The WHY of learning), Representation Networks (The WHAT of learning), and Strategic Networks (The HOW of learning)

Learning is affected by a variety of factors including those organic to the learner, the characteristics of the learning environment, and the interaction between them. Conceptions, processes, the interdependence of learning, class climate, and social and emotional well-being, as well as academic self-concept and school engagement, all affect learners’ experiences at school (Katz & Sokal, 2016).

In UDL classrooms, teachers plan the highest achievement for all students including exceptionalities at both ends of the spectrum of learning as well as the group in the middle. Instruction is no longer blanketed teaching but planned for learner success instead of waiting for learner failure (Standford & Reeves, 2009).

The term 'universal design' was first coined in architecture, and refers to a concept or principle for designing and delivering products and services that are usable by people with the widest range of functional capabilities.

Universal Design for Learning (UDL) was born in 1984 when Dr. David Rose and Dr. Ann Meyer from the Harvard School of Graduate Education, incorporated The Centre for Applied Specialised Technology (CAST) with the goal of revolutionizing the way that students with special needs were taught. Soon after this, the goal evolved to address the “disabilities of schools” instead of the “disabilities of the individual” (Thibodeau, 2021, p. 2). Through the UDL framework, barriers to learning for all learners can be removed and inclusive teaching practices can be implemented to meet the needs of every student.

Universal design for learning (UDL) is a teaching approach that works to accommodate the needs and abilities of all learners and eliminates unnecessary hurdles in the learning process. This means developing a flexible learning environment in which information is presented in multiple ways, students engage in learning in a variety of ways, and students are provided options when demonstrating their learning (Centre for Teaching Innovation, n.d.). There can be presentations, groupings and so on. This paper serves to define the Universal

Design for Learning as well as its purpose, explain its principles and even give its guidelines while also clarifying its components.

Leaders in modern education are making choices inside the classroom to reach beyond planning lessons that approach engagement in a singular point of view. Proper teachers are teaching students with Universal Design for Learning (UDL), reaching the accommodations, needs, and abilities of all participants in the learning community (Cornell University, 2022). This presentation will discuss specific examples of how to create flexible learning modes that engage students, and allow them to learn similar content in different manners. Additionally, UDL provides a platform in which students can show an understanding of their preferred learning style.

II. METHODOLOGY

Universal Design for Learning (UDL) is an educational framework that was created by U.S. organization CAST to challenge the idea of a “one size fits all” learning approach. This framework designs the learning goals, materials, methods, and assessments, as well as the educational policies that guide these elements, taking into consideration the diversity of learners and their needs. (AHEAD, 2017).

UDL is an educational strategy that uses a mixture of teaching techniques and classroom designs to meet the learning requirements of all students by removing barriers through flexible instruction and assessment while encouraging and maintaining motivation (Morin, n.d).

Universal Design for Learning (UDL) is a proactive instructional framework that guides educators in designing learning experiences that meet the needs and interests of all learners and the acronym is succinctly defined within the CAST (2010) video as:

- Universal: A differentiated and inclusive curriculum that can be used by all learners through various learning opportunities.
- Design: Goal-oriented, flexible, accommodative, supportive, and challenging.
- Learning: “What”, “How”, and “Why” of learning to provide the learners with appropriate knowledge, skills, and motivation to learn.

According to Allison Posey (n.d.), UDL is based on brain science and evidence-based educational practices. It guides the design of learning experiences to proactively meet the needs of all learners. Hence, when you use UDL, you assume that barriers to learning are in the design of the environment, not in the student.

Rose & Meyer (2006) explained that it carries the idea that teachers plan instruction for success of all students. Instead of waiting for a student to fail, to lag behind in progress, or to struggle, instruction is planned so that needs are met on the front end of the learning process.

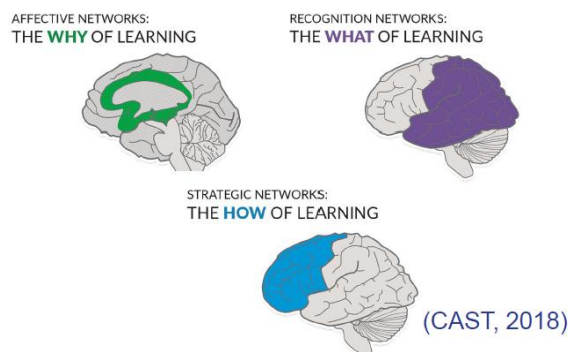
UDL is based on neuroscience using scientific insights on how humans learn. This educational approach helps teachers by encouraging them to use in their teaching practices the three important principles of engagement, representation, and action and expression. (AHEAD, 2017).

By using UDL in their classrooms, teachers give equal opportunities to all students to thrive in their academic journey, by catering to the needs of all learners, regardless of their race, gender, socioeconomic background, learning abilities, or even motivation, removing all barriers to learning. (Teachings in Education, n.d.). The main purpose of UDL is to **plan** from the start of classes to provide learning opportunities for all learners from low to high achievers to be motivated and academically succeed. Moreover, UDL guidelines **help** teachers move from a one-size-fits-all approach toward one that adapts to learner variability. These embrace the idea that we should have firm goals for students—using flexible means to reach those goals resulting in more equitable and engaging classrooms (Schwartz, 2022).

According to Reading Rocket (2019), Universal Design for Learning is “an approach to teaching and learning aimed at meeting the needs of every student in a classroom by giving all students an equal opportunity to succeed” (p. 1). Thus, it is aimed at the removal of barriers to learning through the use of varying teaching methods that are flexible and adaptable so that equity in opportunities for success is achieved among all students (Morin & Understood, 2018).

Moreover, UDL provides educators with an outline for generating instructional goals, methods, materials, and assessments that work for all regardless of their strengths, abilities, disabilities, or needs. There are three main principles of UDL designed to help educators better engage students, and improve the way information is presented by enhancing tools and resources. These principles are engagement, representation, action, and expression.

UDL’s three main principles include the use of various instructional deliverables – “recognition of learning”; providing a variety of assignments, assessments, and scaffolding – “strategic learning”; and selection of choices to keep the learner motivated – “affective learning” to become successful at meeting the learning outcomes (Strangman, Hall, & Meyer, 2004, p. 17). The three principles of UDL are **representation, action and expression, and engagement**. These are used to eliminate barriers to learning in a diverse classroom.



PRINCIPLE 1: PROVIDING MULTIPLE MEANS OF REPRESENTATION

When using UDL, it is encouraged to offer information in more than one format, so that all students have a chance to access the material in ways that are suited to their specific strengths (Morin, 2021). Learners differ in the ways that they perceive and comprehend information. Those with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth may all require different ways of approaching content.

Some students might grasp information quicker or more efficiently, through visual or auditory means rather than printed text. Also, learning, and transfer of learning, occur better when multiple representations are used, allowing students to make connections between concepts. To address varied learner capabilities and needs, multiple and flexible methods of presentation of content and information are used to support recognition learning (Dalton, 2017).

Learners differ in the ways that they perceive and comprehend information that is presented to them, thus a variety of options for perceptions should be made available to students. For example, in a literature lesson, teachers can present the learning materials through a variety of media and provide multiple examples that can be modified in complexity to meet a range of learning needs. This will accommodate the various learning abilities and preferences of learners.

Students who face challenges in following up on texts from novels can benefit through watching set book movies like Macbeth or Romeo and Juliet. This principle aims to provide multiple means of engagement through various options for *recruiting interest, sustaining effort and persistence, and self-regulation* such as:

- Giving students choices to fuel their interests and autonomy.
- Helping students risk mistakes and learn from them.
- Always keeping in mind the learning goal.

PRINCIPLE 2: PROVIDING MULTIPLE MEANS OF ACTION & EXPRESSION

UDL suggests that students have more than one way of interacting with the materials to show what they have learned. (Morin, 2021). This requires a great deal of strategy, practice, and organization, and is another area in which learners can differ. They differ in the ways that they can navigate a learning environment and express what they know. (Carroll, 2018). E.g.,

- Individuals with significant movement impairment (cerebral palsy).
- Those who struggle with strategic and organizational abilities (executive function disorders).
- Those who have language barriers, and so forth approach learning tasks very differently.
- Some students may be able to express themselves well in written text but not speech, and vice versa.

To address varied learner capabilities and needs, multiple and flexible methods of action and expression of students' learning are incorporated into instruction to support strategic learning (Dalton, 2017). Teachers can incorporate instructional methods and strategies that allow students to demonstrate their knowledge and skills in different ways.

For example, learning centres are a great way to allow students to experience learning in diverse ways and for them to show how they understand and apply what they would have learnt. These flexible working spaces allow for individual work and group tasks, thus accommodating different learning experiences.

Students with sensory disabilities (e.g., blindness or deafness); learning disabilities (e.g., dyslexia); language or cultural differences, and so forth require different ways of approaching content, thus providing information through different modalities is crucial.

This principle aims to provide multiple means of representation through various options of *perception, language and symbols, and comprehension* such as:

- Presenting content and information in multiple media.
- Providing varied support.
- Using graphics and animations.
- Highlighting the critical features.
- Activating background knowledge.
- Supporting teaching vocabulary.

PRINCIPLE 3: PROVIDING MULTIPLE MEANS OF ENGAGEMENT

Teachers, in UDL, are encouraged to provide multiple ways to motivate students. Learners will be encouraged to learn in different ways, depending on their culture, neurology, personal relevance, and prior knowledge (Morin, 2021).

Some students, like the ones with dyslexia, will be more motivated to learn with experiential learning than with printed texts, while kinaesthetic learners will prefer to learn through role-play and drama. Some students will prefer strict routines, and others, a more flexible environment, and while some will like to work alone, others will appreciate working collaboratively in group work.

In reality, there is not one means of engagement that will be optimal for all learners in all contexts. Providing multiple options for engagement is essential. To address varied learner capabilities and needs, multiple and flexible options for engagement in the learning process are used to support effective learning.

Teachers can design and plan instruction that involves creating interesting and varied learning opportunities that motivate and stimulate learners according to their personal backgrounds and interests. Teachers can also utilize a range of approaches to engage and motivate students to learn. UDL recognizes that if students can't access information, they can't learn it. So, in a UDL classroom, materials are accessible for all types of learners. Students have many options for reading, including print, digital, text-to-speech and audiobooks, games etc. to keep them engaged.

This principle aims to provide multiple means of action and expression through various options of *physical action, expression and communication, and executive functions* such as:

- Giving students plenty of options for expressing what they know.
- Providing models, feedback, and supports for their different levels of proficiency.

III. DISCUSSION

Gardner who first came up with the theory of Multiple Intelligences in 1983. Providing learning opportunities that address all nine of Gardner's identified intelligences is vital to ensuring equity in the classroom (Almeida et al., 2010). Learning in this way gives learners opportunities to grow in many areas, excel in some, and ultimately be more successful and ready to apply their knowledge to new situations.

The provision of these learning experiences should be equitable to support the success of all learners. From physical support to removing other barriers, promoting equity can encompass a wide range of topics. In designing equitable learning experiences, UDL plays an important role. When followed correctly the UDL guidelines create learning opportunities that are inclusive of all learners in a variety of environments (UDL and Equity, 2021).

The lesson plan addresses the UDL guidelines of Engagement, Representation, Action & Expression. To answer the 'why' of the learning, students will have choices and autonomy. They can choose to work individually, in pairs, or small groups on either of the four questions. It is to be noted that these questions have been finalized after a class discussion and consensus in a previous lesson. The students have the choice of selecting content, process, and final product as well.

Students' interests will be recruited by providing a choice in selecting a topic to work on that will reflect their interests and derive them to work better due to better motivation. The 'what' of learning is also addressed for a variety of learners through flexible content (Bray, 2017). After selecting a topic, they can ask whichever peer they like to work with them or just share ideas (data). This method is suitable for all learners. Finally, the 'how' is addressed by a variety of assessment techniques, such as illustrations in front of the whole class, sticky notes for self-assessment, or interviews with peers for peer assessment. This accommodates different types of learners and also provides multiple means of expression by varying products (Self-paced Access MOOC, 2016).

The four components in a UDL curriculum are GOALS, METHODS, MATERIALS, and ASSESSMENTS.

- The **goals** are articulated so every student can reach, and set high expectations, differently from the traditional curricula, instead of focusing on content, UDL focuses on developing 'expert learners'. Goals- Skills and concepts that the learners need to learn, based on the learning objective listed in the lesson.
- The UDL curriculum offers a large range of **methods**, allowing enhancements for learning through differentiations according to the goal of instruction and based on each learner's capabilities, and classroom climate. Methods- Multiple instructional techniques that can be used to facilitate learners in learning the content.
- The media used to present content, or to learner's demonstration of knowledge, are the **materials**, which, in a UDL framework, have flexibility and variability supporting the needs of the learning process, as well as a successful engagement to learning, allowing varying levels of support and challenges.
- UDL aims at the goals, so the means to **assessments** can be broad and can accommodate students to more accurate measures of their knowledge, skills, and engagement.

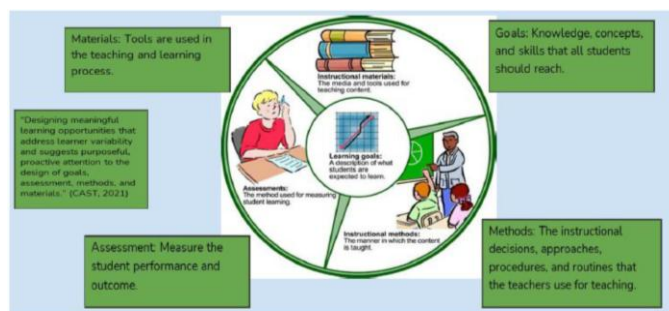


Image: UDL Components (Rose, 2021)

The UDL curriculum has four interdependent components. All components are found in conventional curriculum schemes, however, UDL makes adjustments to put students ahead in the planning process.

UDL Goals

With an old-school approach to setting up learning goals for a class, instructors aim to teach prescribed content and knowledge. This ideology assumes that no matter the audience, the approach of the teacher will reach the learners resulting in accomplished learning standards. With UDL curricula, class leaders sculpt goals to accommodate differences in a class community, providing a multitude of opportunities for participants to reach goals (CAST, 2011). Therefore, teachers plan to set individuals up for success, instead of concentrating on the most ideal method of education dissemination for a population of listeners.

Methods

The methods that teachers use inside the classroom extend far beyond the language of instruction and the frequency of written work versus hands-on activities. These are the decisions that professionals must use expert discretion with to choose how to approach class norms and expectations. UDL-trained teachers rely on personal relationships and evidence-based data to elect which methods work best for the specific students in a given learning environment (CAST,

2011). No two class groupings are alike therefore no two teachers can mirror each other's teaching methods in their separated classrooms. Although parents and traditional-styled educators might believe that two classes of students in the same grade level (at the same school) should be a replica of each other, this is most definitely not the case with UDL curricula.

Materials

Learning materials are the tangible resources that teachers use to implement teaching and learning within an educational space. This may extend to home learning and the display of understanding. What makes UDL stand out is the fluidity with which educators have to reach their learners, and the advocacy the learners have to demonstrate their understandings of different topics and concepts. By thinking outside of the box and not locking people into a set stage day after day in a schooling environment, the educational journey is limitless and students are not restricted to a pathway that may very well not suit their needs or unique expressional preference.

- Media read on hard copies or soft copies → Artistic expression always allowed
- Information absorbed via audio or visual → Note taking on posters, coloured paper, electronics
- Presenting knowledge in speech or movement → Markers, coloured pencils, and paint used to mindmap

Assessments

Assessments are the unaided testing of participants to gauge the real understanding of what has been completed during the learning process. The checkpoints along the way are known as formatives, and the final check is considered to be summative. Just as the root word implies, it is the summary of what has been digested in all of the learning engagements leading up to the finale. But how can a teacher know what a student knows and doesn't know without telepathy? UDL curricula can only be considered successful if the assessment can show an exact reading of a student's understanding. "By broadening means to accommodate learner variability, UDL assessments reduce or remove barriers to accurate measurement of learner knowledge, skills, and engagement" (CAST, 2011, p.8). In conclusion, teachers need to allow for a variety of learning styles while planning for assessments.

IV. FINDINGS

Strategy 1: Provide Assignment Options

Rationale: Allowing students to choose their assignment and thus have control over how they will be evaluated allows them to demonstrate learned content in a fashion that fosters creativity.

Mode of Instruction: This can be done in several ways, but one option is giving students a menu of assignments

Strategy 2: Use Technology

Rationale: Technology in the diverse and inclusive classroom is an asset because it broadens the range of tools available to all students.

The use of technology can help eliminate barriers by providing text-to-speech and/or speech-to-text capability, which meets the principle of Engagement, by facilitating coping skills of disabled students through the use of apps and other software.

The use of technology can provide translations and visual and auditory presentations of content, which can offer ways of customizing the display of information while offering alternatives that meet the principle of Representation.

The use of technology can provide a range of options for Action & Expression, optimizing access to tools and resources..

Strategy 3: Offer Flexible Workspaces

Rationale: According to Minero, "Flexible classrooms give students a choice in what kind of learning space works best for them, and help them to work collaboratively, communicate, and engage in critical thinking". Flexible workspaces offer various options for Engagement by providing opportunities to foster collaboration and community and facilitate personal coping skills and strategies through autonomy and control.

Flexible workspaces offer a variety of options for Representation, as they provide opportunities to modify the physical environment to meet the needs of all learners.

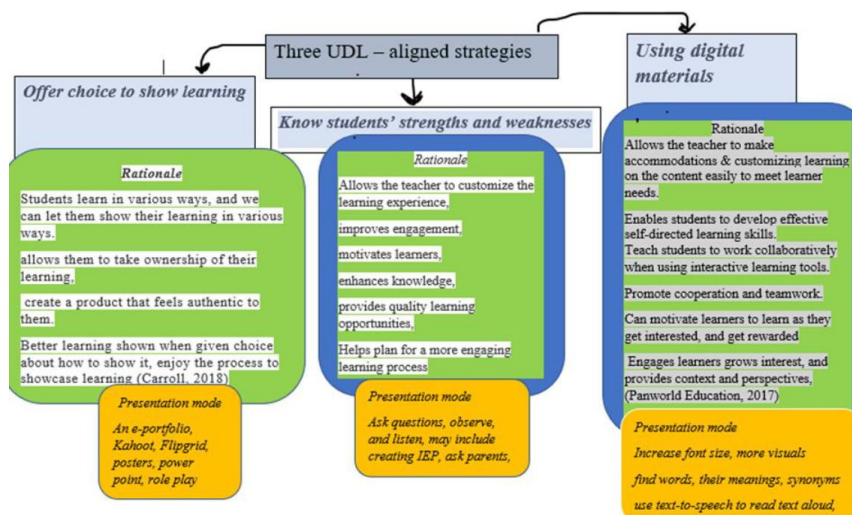
Mode of Instruction: Flexible workspaces can be used in many ways to meet the needs of all students introducing a variety of seating options that are both conventional and non-conventional

Tables of different heights at which students may stand or sit

Comfortable, private spaces for individual work and large, open spaces for group work

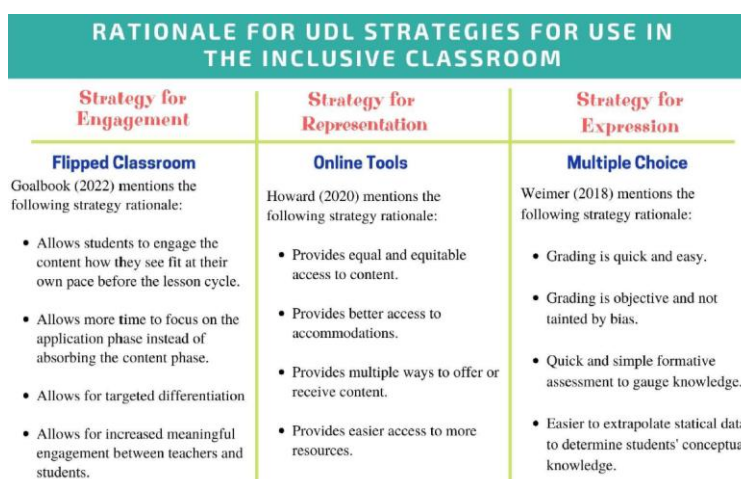
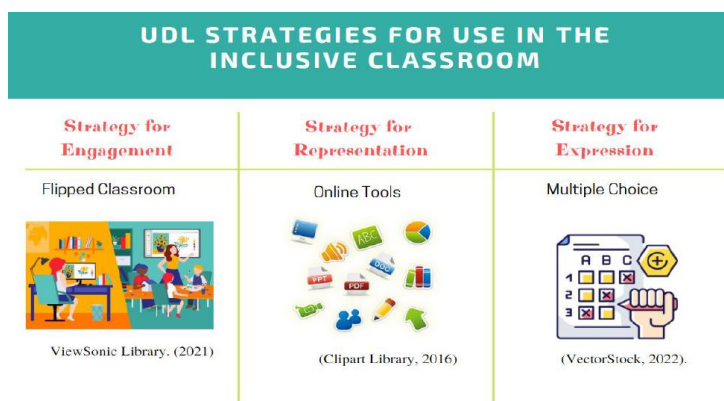
A library area with a variety of books and materials on bookshelves accessible by all students

Designated spaces for arts and crafts and technology such as computers.



Strategies for an Inclusive Classroom

The three strategies to be used in an inclusive classroom are suggested in the UDL chart with rationale for uses. UDL Strategies for an Inclusive Classroom.



Graffiti: a learning strategy where students move around the room writing down, drawing, or dictating everything they know about a particular topic on large sheets of paper. It's a kinaesthetic cooperative activity that gets students actively engaged, and is suitable for students with attention problems.

Videos: YouTube videos or internet technology to provide visual support makes the content come alive for students and builds comprehension for all. It can be watched once, discuss it and watch again to clarify what was discussed.

Kurzweil 3000: a text reading system available for Windows or Mac-based computers. It includes a variety of tools to support struggling readers in K-12 classrooms. It helps students with UDL.

Google Education Tools: Google Education tools offer a variety of applications that can help learners engage, help educators present information in multiple forms, and assess meaningfully. One example of such tools is Google Arts and Culture, which allows students to visit museums on their devices, interact with objects, learn to sculpt pottery at home, and much more. Google forms, slides, canvas, docs, and other applications allow students and teachers to collaborate in creating surveys, presentations, and a variety of products that provide multiple modalities. For example, Canva provides students with multiple templates for creating videos to share their learning, design logos, or even write stories. Templates provide a choice and are useful for learners who find it challenging to start a design from scratch, while those who are adept in using technology to design may choose to start with a blank Canva and use the available elements to bring their ideas to life. There are also free add-ons within Google Education tools, such as reading software or thesaurus to assist learning.

UDL Curriculum Toolkit: This open-source web application has been designed by CAST, the University of Michigan, and the Education Development Centre (EDC) and it supports the creation of interactive multimedia curricula. For example, educators can use features such as highlighting accessible text, note-taking prompts, video, and teacher feedback tools to support learning based on the UDL framework. One of these tools, iSolveIt, is designed to help students learn logical thinking in Mathematics (CAST, n.d.).

Activity Centres: Activity or learning centres help make a classroom environment more inclusive and allows teachers to cater to the need of diverse learners. The booklet *Designing effective activity centres for diverse learners: A guide for teachers at all grade levels and for all subject areas* (Hilberg et al., 2003) provides guidance and examples for creating these centres. One example is using reading stations divided by genre so that students engage by choice.

UDL Resources are used to enhance learning experiences, address different needs and learning styles, and increase interaction between students and teachers. There is a myriad of resources available to support UDL principles of representation, action and expression, and engagement through videos, infographics, blogs, written text, and technology, among others.

V. CONCLUSION

This presentation has examined Universal Design for Learning, a “best practice” approach suitable for a diverse and inclusive classroom (Universal Design for Learning Information for Educators, n.d.). With the three principles embedded in the approach, it enables the educator to represent the content in multiple ways so that the learners understand and make sense of the what.

It also enables the educator to engage the learner in multiple ways so the learner interacts and gains knowledge and skills from the content. Further, it enables the educator to design flexible ways of expression and action for the learner so that the learner has choices in demonstrating the knowledge and skills gained.

UDL represents an approach that is beneficial for all students, including those learning English, older students, and those with disabilities (TEAL, 2010). Additionally, it helps the teacher to meet the challenge of serving those with special needs while enhancing learning for all.

UDL (Universal Design for Learning) is a learning approach that addresses students' different learning styles by reducing barriers to learning. One method cannot meet the needs of all students within a multicultural classroom. Learning goals must be accomplished through multiple paths. To maximize UDL's impact on learning, school leaders should support the development of digital learning resources, flexible instructional practices, and learner-centred curriculum. As a result, students are more engaged in the classroom and have improved academic success, and teachers are better able to support each student.

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