# NON-ACADEMIC DEVELOPMENT OF VISUALLY IMPAIRED CHILDREN THROUGH UNIVERSAL DESIGN FOR LEARNING

*NON-ACADEMIC DEVELOPMENT OF BLIND CHILDREN THROUGH UNIVERSAL LEARNING DESIGN FOR LEARNING*

**GABRIELA FERNANDA SEDUBUN**

S1 Special Education Study Program Faculty of Teacher Training and Education
Sultan Ageng Tirtayasa University

## ABSTRAK

This writing is focused on the non-academic development of visually impaired children through universal *design for learning* learning in planning and implementing an effective learning process and can balance non-academic with academics of students who experience visual impairments or visual impairments. One of the ways to overcome the diversity of characteristics of visually impaired students in an inclusive classroom is to apply the principle of *Universal Design for learning* or commonly abbreviated as UDL. This principle provides flexibility for visually impaired educators to adjust the curriculum, adjust the way of delivery, learning and assess students in a way that is in accordance with existing assessments and strategies.

*Keywords: Tunanetra, Universal design for learning*

## INTRODUCTION

Blind are children with special needs who have visual impairments. Children with visual impairments are also divided into two parts, namely total blindness, individuals who have total visual impairment, or have no vision at all and low vision, individuals who have visual impairment but still have the ability to see. In the world of education, even though the students experience visual impairments, they can still have academic and non-academic achievements that develop. If the academics of a blind educator can still be helped by the world of education in schools, but the slightly difficult thing is to develop non-academics in visually impaired students. One solution to overcome the problem of the diversity of student characteristics in an inclusive classroom is to apply the principles of Universal Design for Learning or commonly abbreviated as UDL.

This UDL approach gives teachers the flexibility to adjust the curriculum, adjust the way learning is delivered, and assess students in the way possible. UDL was initially developed in the world of architecture and product design and later expanded into the world of education. One of the principles that animates UDL is that the curriculum must be made by including certain alternatives so that the curriculum is accessible and suitable for students with different backgrounds, various learning styles, abilities, and disabilities. "Universal" in universal design does not mean one solution for everyone. On the other hand, "universal" in universal design reflects an awareness and recognition of the individual's uniqueness and the need to accommodate diversity, as well as how to create a learning experience that suits the characteristics of the learner, and maximizes his or her ability to progress (Rose & Meyer, 2002, p. 70).

## RESULTS AND DISCUSSION

The development of visually impaired children in the context of education is a very important aspect and requires special attention. In addition to academic development, the non-academic development of blind children, such as social, emotional, and independence skills, also plays a crucial role in their lives. Effective learning must be able to accommodate the various needs and potentials of blind children to ensure that they have an inclusive and meaningful learning experience.

One approach that can be used to support the non-academic development of visually impaired children is Universal Design for Learning (UDL). UDL is a framework that aims to increase accessibility and diversity in the teaching and learning process. This approach emphasizes the importance of flexibility

in the presentation of information, the expression of learning, and student engagement, so that all students, including visually impaired children, can participate fully and reach their maximum potential. In the implementation of UDL, various strategies and technologies can be integrated to create an inclusive learning environment. For example, the use of visual and audio aids, customized learning materials, and activities designed to develop the social and emotional skills of blind children. Thus, UDL not only supports academic development but also non-academic development which is essential for the welfare and independence of blind children.

UDL's approach to the education of blind children is also in line with the principle of inclusive education which emphasizes the right of every child to receive a quality education without discrimination. The implementation of UDL is expected to have a positive impact in creating a fairer and more equitable learning atmosphere, as well as increasing the active participation of visually impaired children in various aspects of school life. Through this journal, the authors will explore how Universal Design for Learning can be applied in the context of the education of blind children to support their non-academic development. The discussion will include UDL theories and principles, implementation strategies, as well as case studies or examples of good practices that have been carried out in various educational institutions. The goal is to provide insights and recommendations for educators, parents, and policymakers in an effort to improve the quality of inclusive education for visually impaired children.

## B. UNIVERSAL DESIGN FOR LEARNING

1. Definition Universal "Design for Learning"
Essentially, UDL is an educational concept or approach to designing learning methods, teaching materials, learning activities, and evaluation procedures in an effort to help individuals with "major differences in their ability to see, hear, speak, move, read, write, understand language, organize, engage and remember," (Orkwis 2003, np). Universal Design for Learning is carried out by providing a curriculum and various alternative activities for students with various abilities. This adaptation was designed from the beginning in the learning design and is not an adjustment added later. UDL provides equal access to learning, not just equal access to information. This allows students to choose the most appropriate method to access information while teachers monitor the learning process (Ohio State University Partnership Grant, 2010). Within UDL, it is assumed that no single method of presentation and expression can provide access for all diverse learners. For this reason, learning activities and materials designed to offer flexibility and various alternative ways of learning are provided (Rose & Meyer, 2002; Scott, McGuire, & Shaw, 2003). These accommodations are designed directly to the teaching materials so that all learners with different abilities can use the same materials, but in a way that is tailored to their abilities and learning needs (Freund & Reach, 2005, p. 81).
Universal Design for Learning is defined as a learning framework that contains a method for diversifying learning so that the general education curriculum can be provided to every student (Orkwis & McLane, 1998). UDL is not intended to eliminate academic challenges, but UDL is only intended to remove barriers to access to learning and information. What UDL promises is flexibility, fairness, and accessible ways of teaching. With this approach, teachers can reach each student, whether they have a disability or not, by providing a platform for each student to interact in a way that supports a unique learning style (Council for Exceptional Children, 2005, p. 2). Some of the benefits of implementing this strategy in the United States include learning for students who speak English as a second language, students with disabilities, and students whose learning styles are inconsistent with their teachers' teaching styles (Ohio State University Partnership Grant, 2010). Universal Design for Learning refers to the fact that rather than creating a curriculum and then adapting it to meet the needs of each student in the learning program, it is better to create a learning design that from the beginning provides students with alternative ways to access and convey information and express what they have learned (Blagojevic, Twomey, & LABAs 2002). This framework explains the importance of a universal learning planning and design that is carried out from the beginning to meet the needs of all learners with a diversity of characteristics.
2. Principles in Universal Design for Learning

According to Conn-Powers (2006) there are several main principles that must be fulfilled in Universal Design for Learning in an effort to accommodate the diverse needs of students:

Physical Principles

1) Equitable Design, which is a design that allows all students to access the same information and avoid segregation or giving stikma to anyone.

2) Flexibility in use, which is a design that can accommodate various individual preferences and abilities.

3) Simple and intuitive, i.e. Design that is easy to understand.

4) Perceptible Information, which is a design in communicating the necessary information effectively to the user, through a variety of ways (pictorial, verbal, tactile), regardless of the user's sensory ability.

5) Tolerance for errors, Design that minimizes harm and adverse risks from intentional or unintentional actions.

6) Low Physical effort, i.e. Design that can be used efficiently, comfortably and without fatigue.

7) Approach Size and space in use, namely the provision of the right size and space, adjusted to the student's body size, posture, or mobility.

B. Principle of Flexibility in Curriculum Development In the Universal Design for Learning approach, learning materials that accommodate the needs of all students are developed from the beginning. The UDL covers the basic concepts of "universal design" described above and establishes the following three principles of flexibility for curriculum development (SETDA Policy Brief, 2014):

1) Provide several alternative means of representation, presenting information and content in different ways;

2) Provide several alternative means of action and expression so that all students can show and express what they know; and

3) Provide several alternative ways of participation, stimulating interest and motivation to learn

These UDL principles can be applied to learning, method, material, and assessment purposes. This UDL can be done with the use of digital content, considering that digital text and media provide better flexibility than the use of traditional media. This is especially true where digital content is device-independent, with permission to create derivative works, because with it educators can translate and transform the material into other formats adapted to the characteristics of the learners. Related to teaching materials, the implementation of Universal Design for Learning includes several things: accessibility of printed materials, accessibility of digital content, accessibility of visual teaching materials, and accessibility of audio teaching materials.

## C. APPLICATION OF "UNIVERSAL DESIGN FOR LEARNING" IN LEARNING

In this section, several examples of teaching materials that apply the principles of Universal Design for Learning will be presented. As explained in the previous section, the application of Universal Design for Learning to teaching materials includes several things: 1) accessibility of printed materials, 2) accessibility of digital content, 3) accessibility of visual teaching materials, and 4) accessibility of audio teaching materials. Related to materials that require understanding concepts, there are separate problems for students who experience reading difficulties. This is because these concepts are generally presented in the form of texts such as in history lessons. The obstacle also occurs at the assessment stage which usually requires writing activities. Therefore, the integration of assistive technology in learning is needed to support accessibility as mentioned above. Assistive technology is technology aimed at improving, or maintaining the functional abilities of students with special needs (Rose, nd) To realize an accessible teaching material as mentioned above, the teaching materials used must be in digital form. This is because digital teaching materials are very flexible so that they can be easily manipulated, modified, and combined with technology assistance. Here are some examples of the application of Universal Design for Learning to teaching materials combined with technology assistive:

1. Use of Digital Teaching Materials

As explained above, the accessibility of teaching materials can be achieved by using teaching materials in digital form because it strongly supports flexibility. For example, these flexibility are the size, type, and color of the font that can be adjusted, the color and brightness of the text background that can be adjusted, and the compatibility to be combined with technology-assisted applications such as screen readers, etc. When we use the term visually impaired, usually what comes to mind is someone who is unable to see at all. However, the term blindness actually refers to two types of visual impairments, namely: "totally blind" and "low vision". Totally blind means total blindness, while "low vision" means someone who is still able to see at a certain distance and conditions. Related to learning with the "low vision" type, with certain criteria, they can still access visual teaching materials with the help of assistive technology that can modify visual appearance.

One of the assistive technologies that can be used to help learners with low vision is "open book" software. This "open book" can be used to make the display of text on the computer screen very large and use colors, background colors, cursor coloue which can be customized according to the needs of learners. In addition, the "open book" is also equipped with a "speech synthesizer" that is able to voice the text on the screen. The following is an example of the interface display on "open book" software for low vision students.

2. Learning Using "Blackboard Collaborate"

One of the biggest challenges in inclusion classes is the diversity of student characteristics so that it requires a variety of assistive technologies. One of the applications that meets the principle of "Universal Design for Learning" that can be used in learning both online and offline is "Blackboard Collaborate". This is an application whose features have been designed in such a way as to eliminate learning barriers for people with disabilities.

The accessibility feature on "Blackboard Collaborate" allows people with disabilities to fully engage and participate in the teaching and learning experience. Here is a summary of how "Blackboard Collaborate" removes barriers to universal access.

   a. For those with visual impairments (Totally Blind and Low Vision)

-Inherited user, user-definable operating system color contrast scheme

-User interface that can be customized with personal settings

- Moderator-adjustable scale of Whiteboard Content display

and participants

-Notifications equipped with audio such as the presence of an important event in the session (raise hand, participant joins /

leaving class, incoming chat messages, etc.)

-Supports the use of screen readers across the main interface

b. For those with hearing impairments

- Text captions on each activity window of all sessions

-The presence of a text message feature

-Integrated subtitles/closed captions so that verbal explanations can be translated into text directly

-Multi- streaming

- Ability to save the activities of all participants

live and archive

   b. For those with learning disabilities

   c. - There is an "Activity window" that condols what happens in the session to help students stay focused

   d. -Ability to provide additional time to read presentation slides

   e. -Ability to explain visual content using VOIP or phone to students who have difficulty reading

   f. -Allows breakouts for personal support (one by one), additional training, tutoring

*International Conference on Learning Community (ICLC)*
2875

ICLC 2024
INTERNATIONAL CONFERENCE
ON LEARNING COMMUNITY
UNTIRTA-INDONESIA

SUPPORT BY :

g.  - Ability to respond verbally with a microphone/phone or by typing a message in the chat window
h.  -Presence of fully interactive Recordings to repeat classes/content as often as necessary
i.  - Ability to store teaching materials on a "white board" for further study outside of the classroom.
j.  - There is a feature that supports instructors in transferring note files to help students in learning.

## D. APPLICATION OF "UNIVERSAL DESIGN FOR LEARNING" IN LEARNING FOR THE VISUALLY IMPAIRED

### 1. Prinsip-Prinsip Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is an educational framework that aims to improve and optimize teaching and learning for everyone based on the science of how humans learn. UDL offers a flexible approach that can be tailored to the individual needs of students. Universal Design for Learning (UDL) is an educational framework that aims to create an inclusive and accessible learning environment for all students, including those with special needs such as the visually impaired. UDL is based on three main principles: representation, expression and action, and engagement.

The principle of representation emphasizes the importance of providing various ways to present information to students. Since every student has a different learning style, information must be provided in a variety of formats such as text, images, audio, and palpable materials. For example, digital textbooks with text-to-speech features and audiobooks allow visually impaired students to listen to the subject matter. In addition, images and graphics in the subject matter must be accompanied by alt text descriptions or verbal descriptions so that visually impaired students can understand the content.

The principle of expression and action ensures that students have a variety of ways to demonstrate what they know and can do. This includes the use of adaptive technologies such as screen reader software, Braille displays, and custom keyboards. Students are also given the option of completing assignments, such as through audio recordings, oral presentations, or Braille writing, so that they can express themselves according to their abilities and convenience.

The principle of engagement focuses on how students are motivated and engaged in the learning process. This includes giving students choices about how they learn and complete assignments, which helps them feel more engaged and have control over their learning. The context of the subject matter should be relevant to the student's personal interests and experiences to increase their intrinsic motivation. Additionally, collaboration through group projects and discussions creates a sense of community and support among students, as well as creating an inclusive and safe learning environment where all students feel welcome and valued.

By applying these principles, UDL creates a flexible and inclusive learning environment, which is able to accommodate the diverse needs of students. The principles of representation, expression and action, and engagement ensure that every student, including blind students, has the opportunity to succeed in their education. The three main principles of UDL are:

1.  **Representation**: Provides a variety of ways to access and present information. The Principle of Representation relates to the way information is presented to students. Every student learns in a different way, and this principle ensures that information is available in a variety of formats to accommodate different learning styles and individual needs. Some methods for applying the principle of representation include:

**Variety of Media and Formats**:

2.  **Textual and Visual**: Provides information in the form of text and images.

3. **Auditory**: Uses audio materials such as voice recordings, audiobooks, and text-to-speech tools.
4. **Tactile**: Uses tactile materials such as Braille books and tactile graphics.

**Description of Alternative Text**:

- **Alt Text for Images**: Provides a text description that explains the contents of the image or diagram.

**Verbal Description**: Provides a verbal description for each visual used during

- instruction, so that visually impaired students can understand the content.

**C.Highlighting and Emphasis**:

- Use colors, fonts, or icons to highlight important information or to aid in understanding key concepts.

2. **Expression and Action**: Provides a variety of ways for students to demonstrate what they know and can do.

The Principles of Expression and Action are concerned with the way students express what they know and demonstrate their abilities. Every student has a different way of expressing themselves, and this principle ensures that students have a variety of ways to participate and demonstrate their learning. Some methods for applying this principle include:

- Various Methods for Actions and Expressions:
    1) Adaptive Technology: Uses computer-like technology with screen reader software, Braille display, and a dedicated keyboard.
    2) Choice in Assignments: Give students the option to complete the assignment in a way that works best for them, such as through audio recordings, oral presentations, or Braille writing.
- The Right Tools and Resources:

    1) Software and Apps: Leverage a variety of apps that support accessibility, such as text-to-speech tools, screen reader software, and custom educational apps.
    2) Physical Tools: Using physical tools that support the needs of visually impaired students, such as Braille books and tactile graphics.
- Guidance and Feedback:

    1) Provide clear guidance and constructive feedback to help students improve and enhance their learning.

3. **Engagement**: Provides a variety of ways to motivate and engage students in the learning process. The Principle of Engagement relates to the way students are motivated and involved in the learning process. This principle ensures that all students have the opportunity to feel motivated and engaged, as well as create an environment that supports their active engagement. Some methods for applying this principle include:

- Choice and Autonomy:

    1) Choice in Learning: Giving students choices regarding how they study and complete assignments, allowing them to feel more engaged and in control of their learning.
    2) Goal Setting: Helps students set personalized and relevant learning goals, increasing their intrinsic motivation.
- Relevance and Value:

**1)** Relevant Context: Relate the subject matter to students' personal interests and experiences, and demonstrate how the learning is relevant to their lives.

Engaging Materials: Using interesting and varied subject matter to keep students interested.

Collaboration and Community:

Collaboration: Encourages collaboration through group projects and discussions, creating a sense of community and support among students.

**1.** Supportive Learning Environment: Establish an inclusive and safe learning environment where all students feel welcome and valued.

The application of UDL principles aims to create a flexible and inclusive learning environment, which is able to accommodate the diverse needs of students. By providing a variety of ways to represent information, express learning, and engage students, UDL ensures that every student has the opportunity to succeed in their education, including blind students who require a specialized approach to accessing and utilizing learning effectively.

## 2. Implementation of UDL in Learning for the Blind

The implementation of UDL for visually impaired students requires special adaptations to meet their visual needs. Here are some strategies that can be implemented:

**a. Provision of Accessibility in Information Representation**

1. **Audio Material**:
   - **Digital Textbooks with Text-to-Speech**: Digital textbooks can be converted to audio format using text-to-speech technology, so that visually impaired students can listen to the subject matter.

   - **Audio Books**: Using audiobooks as the primary or supplementary learning resource, providing easier and faster access to the material.

2. **Text to Image Description**:

   - **Alt Text**: Each image, graph, or diagram in the subject matter must be accompanied by an alt text description describing the visual content.

   - **Verbal Description**: Teachers can provide detailed verbal descriptions of images or other visuals used during instruction.

3. **Braille in Tactile Graphics**:

   - **Braille Books**: Provides study materials in Braille format for visually impaired students.

   - **Tactile Graphics**: Using tactile graphics in place of visualizations, helping visually impaired students understand concepts that are typically presented visually.

**b. Diversification of Methods of Expression and Action**

1. **Adaptive Technology Devices**:
   - **Computers with Screen Readers**: Using screen reader software that helps visually impaired students access digital information.
   - **Braille Display**: A device that displays digital text in Braille format so that visually impaired students can read and write in Braille.
   - **Custom Keyboard**: Uses a special keyboard designed to make it easier for visually impaired students to type and access computers.

2. **Options in Tasks**:
   - **Audio Recording**: Students can record their answers or presentations in audio format.
   - **Oral Presentation**: Provides an option for students to convey their understanding through oral presentations.
   - **Braille Writing**: Allows students to complete assignments or exams in Braille format.

**c. Increase Student Engagement**
1. **Interactive Learning**:
   - **Group Discussions**: Organize inclusive group discussions, in which visually impaired students can actively participate.
   - **Collaborative Projects**: Create collaborative projects that allow visually impaired students to collaborate with their classmates, facilitating social interaction and shared learning.
2. **Intrinsic Motivation**:
   - **Relevant Materials**: Relate the subject matter to the personal interests and goals of blind students to increase their motivation.
   - **Recognition of Achievements**: Providing recognition and appreciation for students' achievements to encourage intrinsic motivation.
3. **Supportive Learning Environment**:
   - **Inclusive Atmosphere**: Creating an inclusive and supportive learning environment, where visually impaired students feel valued and welcomed.
   - **Physical Accessibility**: Ensuring that classrooms and school facilities are accessible to students with visual impairments, including the use of Braille signs and voice guides.

**3. Case Studies and Good Practices**
1. **Inclusive Schools**:
   - Schools that implement UDL often have special programs for students with visual impairments that include the use of assistive technology and customized learning materials.
   - Example: A school in New York uses an iPad device with a special app to help visually impaired students access the general curriculum.
2. **Teacher Training Program**:
   - Teacher training in UDL can improve their ability to design and implement inclusive and accessible learning.
   - Example: A training program in Canada that focuses on UDL techniques to support students with special needs, including visually impaired students.

**4. Challenges and Recommendations**
**Challenge**
1. **Resource Limitations**:
   - Not all schools have access to the assistive technology needed to support visually impaired students.
   - Limited funds to purchase adaptive technology devices and special learning materials.
2. **Teacher Readiness**:
   - Teachers need to be specifically trained to use UDL in their classrooms.
   - Lack of understanding and skills in using assistive technology and applying UDL principles.

**Recommendations**
1. **Investment in Technology**:
   - Governments and educational institutions need to invest in assistive technology to support visually impaired students.
   - Provision of funds to purchase adaptive technology devices such as computers with screen readers, Braille displays, and other devices.
2. **Ongoing Training**:
   - Provide ongoing training for teachers in the implementation of UDL, including the use of assistive technology and inclusive teaching strategies.
   - Workshops and seminars that focus on UDL techniques and the educational needs of visually impaired students.
3. **Collaboration with the Community**:
   - Engage the blind community in the development and evaluation of educational programs to ensure their needs are met.

o   Work with organizations that support the blind to gain additional insights and resources.

With the right implementation, Universal Design for Learning can create a more inclusive learning environment and enable visually impaired students to reach their full potential. The implementation of these strategies is expected to have a positive impact on the academic and non-academic development of visually impaired students, making education more equitable and equitable for all.

## REFERENCES

Conn-Powers, Michael, dkk. 2006. The Universal Design of Early Education Moving Forward forAll Children. http://journal.naeyc.org/btj/200609/ConnPowersBTJ.pdf (Diakses pada 25September 2014)

Gargiulo, RICHARD M. & Debbie METCALF. 2010. Teaching in Today's Inclusive Classrooms.USA: Wadsworth 20 Davis drive. http://www.cengagebrain.co.nz/content/9781133968641.pdf (Diakses pada 25 September 2014)

National Center On Universal Design for Learning. 2012. UDL Guidelines - Version 2.0: http://www.udlcenter.org/aboutudl/udlguidelines/principle1 (Diakses pada 24 September 2014)

Rose, David H., Ted S. Hasselbring, dkk. Assistive Technology and Universal Design for Learning: Two Sides of the Same Coin. http://craigcunningham.com/nlu/tie536fall09/Assistive%20Technology%20and%20UDL_TwoSidesoftheCoin.pdf (Diakses pada 25 September 2014)

SETDA Policy Brief. 2014. THE ACCESSIBILITY OF LEARNING CONTENT FOR ALL STUDENTS, INCLUDING STUDENTS WITH DISABILITIES, MUST BE ADDRESSED IN THE SHIFT TO DIGITAL INSTRUCTIONAL MATERIALS. www.setda.org%2Fresource%2Fthe-accessibility-of-learning-content-for-all-studentsincludingstudents-with-disabilities-must-be-address-in-the-shift-to-digital instructionalmaterials%2F&ei=Iyx1VJWVFsa7mgWbqYCICA&usg=AFQjCNG0yOUPJaoX 1 aLkXESnvWzaZKlg&sig2=oPQ02ue4T0AbLU0TzoeHwg (Diakses pada 25 September 2014)