

Universal Design for Learning in Teacher Education: A Pedagogical Approach to Preparing Pupil Teachers for Inclusive Education Practices

Utkal Keshari Sahoo¹; Eliza Mahapatra²; Dr. Kulamani Sahoo³

¹Research Scholar
Fakir Mohan University, Balasore

²Research scholar
Fakir Mohan University Balasore

³Assistant Professor
College of Teacher Education, Balasore

Publication Date: 2026/05/19

Abstract: Universal Design for Learning (UDL) serves as a significant approach who promotes and supports inclusivity in education through the creation of flexibility in the learning environment for all diverse learners (Cast, 2022). As students' population is more heterogeneous in today's classroom system teacher preparation program must focus on developing the capacity of perspective teachers to address diversity effectively. UDL encourages teacher to construct curricula, teaching strategies, and assessment techniques they are flexible and inclusive and also able to address the diverse capabilities of varied learners. At the heart of UDL are three guiding principles- representation, engagement, and expression—which assist the future teachers in diversifying instructional delivery, enhancing student motivation, and enabling flexible assessment strategies (Cast, 2018). Integrating UDL within teacher education equips perspective teachers to create inclusive learning environment which are accessible by all learners, tailor instruction and respond to the distinct needs of their students. The principle of UDL encourages the teachers in adopting flexible teaching methods and also digital tools to effectively manage heterogenous classroom where different profiles of learner are present (Jackson & Basham, 2024). In addition, it promotes a collaborative learning atmosphere where students contribute ideas and benefit from multiple perspectives.

Although UDL offers a strong roadmap toward inclusive education, its implementation in teacher education quite challenging. Factors such as inadequate training, limitations in resources, and structured curricular constraints often affect its practical use. To address these limitations, it is very necessary for teacher education programs to enhance professional development initiatives, integrate assistive and digital tools, and adopt more flexible curricular and assessment practices. With these measures in place, UDL can be effectively integrated into teacher preparation, fostering learning environments that are both inclusive and engaging. Developing educators' capacity to apply UDL principles is vital for ensuring fairness and accessibility for all learners.

Keywords: *Universal Design for Learning (UDL), Pupil Teachers, Inclusive Practices.*

How to Cite: Utkal Keshari Sahoo; Eliza Mahapatra; Dr. Kulamani Sahoo (2026) Universal Design for Learning in Teacher Education: A Pedagogical Approach to Preparing Pupil Teachers for Inclusive Education Practices. *International Journal of Innovative Science and Research Technology*, 11(5), 595-600. <https://doi.org/10.38124/ijisrt/26may773>

I. INTRODUCTION

As an evolving model in education, Universal Design for Learning (UDL) underscores the importance of constructing flexible and inclusive instructional environments that accommodate a wide range of learner needs (Evmenova, 2018). In the domain of teacher education,

UDL is instrumental in shaping educators who are capable of addressing the complexities of inclusive practice (Evmenova, 2018; Entrampas et al., 2024). Given the growing diversity in classrooms, teachers require effective strategies and resources to ensure that every student, regardless of their background or abilities, has access to equitable learning experiences.

In addition, UDL emphasizes the importance of designing curriculum, pedagogy, and evaluation methods that can be adapted to support multiple pathways of engagement, representation, and learner expression (Jackson & Basham, 2024). This framework encourages educators to actively respond to the diversity present in their classrooms. By embedding UDL within teacher preparation programs, future educators develop essential competencies to create inclusive learning experiences, differentiate instruction, and cater to individual student differences (Entrampas et al., 2024).

II. MEANING OF UNIVERSAL DESIGN FOR LEARNING

Universal Design for Learning (UDL) is a framework that support learner-centred approach and aimed to make more inclusive and effective learning environment for all diverse learners by addressing their diverse learning needs. It rejects the idea of single teaching strategies and instead emphasizes on the importance of flexibility in instructional practices. Its main objective is to provide fair learning opportunities by encouraging educators to adopt the teaching practices which offers multiple means of representation, engagement, and expression (CAST, 2022).

III. KEY PRINCIPLES OF UNIVERSAL DESIGN FOR LEARNING

Universal design for learning is mainly based on three (3) core principles (Cast, 2018). These are: -

➤ *Multiple means of representation*

The first principle of UDL involves presenting learning content in different ways which helps diverse learners to accommodate and perceive this content effectively. (Boothe, et al., 2018). Since students perceive and interpret information differently, offering and applying this principle foster comprehension and inclusion.

- *For example:* - while teaching photosynthesis in science class, A teacher presents this lesson by using text, diagram, a video demonstration, and an interactive 3D model. Each format helps learners grasp the concept through the method that suits them best.

➤ *Multiple means of engagement*

This principle highlights the importance about considering the need of each learner and to keep interested and motivated them by providing different opportunities to participate in learning tasks and also by offering different ways to engage with the material (Boothe, et al., 2018). Due to the changing classroom demands which includes various types of learners, those have diverse interest, learning preferences, and levels of motivation, UDL encourages teachers to provide varied activities and mode of engagement to maintain student engagement (Priyadharsini & Marry, 2024).

- *For example:* - During the lesson on World War- II, the teacher may allow students to explore the topic through reading the written book, watching documentaries,

preparing multimedia projects, or engaging in group discussions. This variety keeps students interested and actively involved.

➤ *Multiple means of action and expression*

At the same time, by using this principle, learners have flexibility in demonstrating their learning and knowledge. Not all students express themselves or process information in the same way, so UDL encourages flexibility in how students show what they have learned (Boothe, et al., 2018).

- *For example:* - to complete the assignment, students are given multiple ways to demonstrate their knowledge and understanding about a given topic. After that, students may choose to write an essay, design an infographic, produce a short video, or record an audio explanation, allowing them to present their learning in ways that reflect their abilities.

IV. CONCEPT OF INCLUSIVE PRACTICES

The concept of inclusive education practices involves the use of teaching strategies that accommodate all students in a common learning environment, regardless of their individual differences. It creates such environment and class atmosphere where every student feels valued, supported, and included in all activities. Teacher responds to learner diversity by adapting teaching methods, materials, and classroom settings to suit different needs. This approach promotes inclusion, respects diversity, and focuses on enabling each student to achieve their full potential.

A. *Why should pupil teachers have an idea about inclusive education practices?*

Pupil teachers should have a strong understanding of inclusive education practices because it directly impacts their ability to effectively teach and support students with special educational needs (SEN) in diverse classrooms. Studies by Bhatnagar & Das (2014) founded that teachers who had contact with individuals with disabilities or focused on disability during their pre-service education were more positive towards inclusive education, which indicating that early exposure shapes their approach to diverse learners. Mohanty & Nanda (2017) found that teachers and headmasters' face challenges due to the lack of training and confidence in managing inclusive classrooms which hampers their ability to support students with SEN, highlighting the need for proper training at all levels of education. Similarly, Bansal (2018) identified that while teachers are generally ready to educate children with special needs, they face significant barriers in the classroom, such as limited resources and strategies, which can hinder their effectiveness. Pati & Khamari (2022) emphasized that many teachers lack a clear understanding of inclusive education and are uncertain about their roles, making it essential for pupil teachers to receive adequate preparation to tackle these challenges. Siron & Mulyono (2017) pointed out that teachers struggle with inclusive lesson planning, individualized education programs, and classroom management, all of which are crucial for successfully implementing inclusive education. Furthermore, Dos, Tutsoy & OfLaz (2019) highlighted that

both teachers and parents often lack knowledge about inclusion, making it difficult to create an inclusive environment at school. Yilmaz & Yeganeh (2021) found that many teachers do not adjust their teaching materials to cater to students' diverse needs, which is a key component of effective inclusive education. Lastly, Musayaroh, Manyanti & Maulidina (2023) reported that while teachers have positive attitudes towards inclusive education, they fear lacking the necessary skills to teach students with special needs, particularly those who require communication technologies such as Braille or Sign Language. In conclusion, these studies underscore the importance of pupil teachers having a solid understanding of inclusive education practices, as it is essential for overcoming barriers, managing diverse classrooms, and ensuring that all students, regardless of ability, receive a quality education.

B. How does Universal Design for Learning Support Inclusive Practices?

Universal Design for Learning (UDL) directly supports inclusive practices by ensuring that all students, regardless of their abilities, backgrounds, or learning styles, have access to meaningful and effective learning experiences. Here's how UDL fosters inclusivity in education:

➤ *Supports the Needs of Diverse Learners*

UDL is grounded in the understanding that classrooms consist of learners with diverse backgrounds and needs. These differences may arise from physical or cognitive disabilities, linguistic diversity, or socio-cultural variations. By incorporating flexible approaches to presenting information, encouraging participation, and allowing multiple forms of expression, UDL supports inclusive learning experiences for every student. Such an approach minimizes barriers and ensures that no learner is excluded from meaningful educational engagement.

➤ *Encourages Flexible and Individualized Learning Experiences*

Universal Design for Learning (UDL) promotes instructional flexibility by enabling learners to engage with educational content through methods that align with their individual preferences and abilities. It allows students to select suitable ways of understanding concepts and expressing their knowledge. For instance, learners with dyslexia may comprehend material more effectively through audio-based resources, whereas students with attention-related challenges may respond better to interactive and segmented learning activities. By accommodating such differences, UDL strengthens learner autonomy and encourages active participation in the learning process (Sharma, 2024).

➤ *Providing Diverse Forms of Content Representation*

UDL emphasizes the importance of delivering educational materials through multiple forms of representation to address learner diversity. Instructional content may be communicated using visual aids, spoken explanations, textual resources, and practical activities so that students can engage with information in ways suited to their individual needs. A learner with limited vision, for example,

may access lessons through descriptive audio support, while a student with hearing difficulties may better understand concepts through captioned multimedia resources. Such flexibility enhances accessibility and supports equitable learning opportunities for all students.

➤ *Enhancing Learner Engagement and Academic Achievement*

Universal Design for Learning (UDL) places significant emphasis on increasing student motivation by designing learning experiences that are meaningful, relevant, and stimulating (Sharma, 2024). By allowing learners to choose among different methods of participation, such as collaborative tasks, project-based activities, or digital tools, UDL encourages sustained engagement in the learning process. Active involvement in learning has been identified as an essential factor in improving academic outcomes (Priyadharsini & Marry, 2024). This flexible approach is particularly valuable for students who may struggle to remain interested in conventional teaching methods that do not address individual learning differences.

➤ *Encourages Cooperative and Interactive Learning*

Universal Design for Learning (UDL) supports collaborative learning by creating opportunities for students to participate and express themselves in diverse ways. Learners are encouraged to engage in group activities, exchange viewpoints, and contribute to meaningful classroom discussions that value individual differences. Such interaction promotes mutual respect and strengthens social connections among students. As a result, UDL helps cultivate a supportive and inclusive classroom environment where learners feel accepted and valued.

➤ *Inclusive Assessment Approaches for Diverse Learners*

UDL emphasizes the importance of assessment methods that acknowledge individual differences in learning and performance. Instead of relying solely on traditional written examinations, the framework encourages educators to incorporate alternative forms of evaluation, including creative projects, oral responses, multimedia presentations, and practical demonstrations. Such varied assessment practices provide students with equitable opportunities to display their understanding according to their unique strengths and capabilities.

➤ *Supporting Learners with Disabilities Through Inclusive Practices*

Universal Design for Learning (UDL) offers significant support to students with disabilities by addressing their individual learning requirements within the educational process. The framework encourages the integration of assistive technologies, such as screen readers, speech-to-text applications, and other adaptive tools, to enhance accessibility. It also allows learners to engage with instructional content through alternative methods suited to their needs. By incorporating these supports into regular classroom practices, UDL creates a more inclusive and accessible learning environment for all students.

V. ROLE OF UNIVERSAL DESIGN FOR LEARNING IN TEACHER EDUCATION

Universal Design for Learning (UDL) plays an important role in teacher education by helping future teachers develop inclusive and adaptable teaching practices that cater to a wide range of student needs. The core principles of UDL — offering varied ways of presenting information, engaging students, and allowing multiple forms of expression — are essential in preparing educators to address the diverse needs of their classrooms. Here's how UDL contributes to teacher education:

➤ *Promoting Inclusive Learning Environment*

UDL enables teacher trainees with the ability to create inclusive learning environment which are accessible to all learners and also help to address the wide range of needs of diverse learners. This approach ensures equal learning opportunities and participation for all students (Priyadharsini & Marry, 2024).

➤ *Enabling Personalized Learning Experiences*

UDL helps future teacher in implementing instructional strategies which address individual differences among learners. Due to its flexibility nature, it is also allowing students to deal with the learning content in such ways that suit their strengths and preferences.

➤ *Ensuring Flexibility in Teaching Practices*

UDL also helps teacher trainees to learn how to adopt flexible instructional strategies, which enables them to modify learning lessons and activities according to the varying needs of students. Which can be helps learners to access the learning experiences meaningfully.

➤ *Utilizing Technological Resources*

UDL encourages to use technological resources and tools to foster inclusivity in education. Due to the diversity in the classroom teacher trainees must know how to use assistive technologies and digital application through which learning can be more interactive and accessible, which is also supported by the implementation of UDL.

➤ *Promoting Reflecting Practice*

Through the use of UDL, teacher trainees are able to evaluate their own instructional methods and after analysing it they can refine and modify their strategies as per the suitability needs of learners and also improve their methods accordingly.

➤ *Strengthening Active Participation among Students*

UDL also providing emphasizes upon active participation among students keeping the view of interest, abilities of all learners. Therefore, Teacher education programmes prepare educators to use diverse strategies that make lessons more engaging and meaningful.

➤ *Promoting Lifelong Learning*

Teachers who are trained in UDL develop a mindset of continuous growth. They are encouraged to remain open to

new ideas, strategies, and technologies that can improve their teaching and help them better support their students.

➤ *Flexible Assessment and Feedback*

UDL also provides guidance on designing assessments that offer students different ways to demonstrate their learning. Teacher candidates are taught how to evaluate students through a variety of methods, such as projects, presentations, and written work, allowing each student to showcase their understanding in ways that work best for them.

Integrating Universal Design for Learning into teacher preparation programs equips future educators with the skills needed to build inclusive, flexible, and engaging learning environments. Teachers who embrace UDL are able to meet the diverse needs of their students, providing every learner with opportunities to succeed.

VI. CHALLENGES AND BARRIERS TO IMPLEMENTATION OF UNIVERSAL DESIGN FOR LEARNING (UDL) IN CLASSROOM

➤ *Limited teacher training opportunities*

Proper teacher training plays a pivotal role in enabling teachers to adopt innovative approaches in teaching-learning process. In the absence of sufficient training on UDL and its practical application, it is too difficult for teachers to apply and integrate its strategies into their teaching practices (Priyadharsini & Marry, 2024). Since many educators are still not fully aware about UDL works and its practical application, there is a strong need for continuous training and skill development among future teachers.

➤ *Lack of required proper learning resources*

The successful implementation of UDL and successfully applying and integrate its principles into the real classroom is largely depend on adequate availability of required and appropriate learning resources. In many schools, it has been evidenced that, there is a shortage of assistive tools, accessible learning materials and trained support staff. Therefore, such limitation creates obstacles in applying UDL strategies which support inclusive teaching strategies.

➤ *Lack of Flexibility in Curriculum and Assessment Practices*

Teacher education programme often follows fixed, traditional and standardized curricula, which provide limited flexibility to adopt such innovative strategies like UDL. Such rigid system strongly hampered the ability of future teachers to experiment with new approaches and inclusive methods. Moreover, the dominance of standardized assessment practices hinders to measure appropriate skills and needs of diverse learners and also discourage UDL principles.

➤ *Technological Barriers*

Due to the absence of adequate technological facilities, including digital tools and good internet access, the principles of UDL might be affected negatively. Such constraints make it challenging to utilize technology-driven instructional methods (Priyadharsini & Mary, 2024).

➤ *Heterogeneity of Students Needs*

Now, in our inclusive classroom, presence of diverse learners creates heterogenetic needs, which create challenges for teacher to prepare such lesson plan to meet and address the needs of diverse learners. Teachers may find it difficult to develop instructional strategies based on UDL principles that successfully addressed the wide range needs of all learners (Priyadharsini & Mary, 2024).

➤ *Issues in data tracking and analysis*

Another concern is the difficulty involved in gathering and interpreting data related to implementation of UDL strategies. Without clear data, it becomes challenging to assess student progress and make evidence-based changes to teaching practices.

VII. ADDRESSING THESE BARRIERS

To overcome these challenges, it is essential for teacher education programs to:

- Strengthen teacher training programme to improves teachers' understanding towards the application part of UDL in real-classroom settings.
- Create such institutional culture that promotes inclusivity, openness, and flexibility in teaching and learning (Entrampas, et al., 2024).
- Ensure the availability of appropriate learning and human resources and sufficient planning time for inclusive learning environment.
- Promote collaboration among teachers to share effective strategies, innovative ideas and classroom experiences.
- Redesign assessment techniques to align with UDL and address the wide needs of diverse learners.

By addressing such these barriers, teacher education programme can become more inclusive, better preparing teachers to meet the wide range needs of all learners in increasingly diverse classrooms.

VIII. CONCLUSION

In summary, Universal Design for Learning (UDL) plays an important role in preparing pupil teachers to work effectively in inclusive classroom. It helps them develop the essential knowledge, skills, strategies, attitudes and practical approaches to address the wide range of needs of diverse learners. As, nowadays, classroom includes more heterogeneous students, teachers are expected to adopt approaches that are both adaptable and equitable (Javed, et al., 2022). UDL helps in fulfilling these needs by promoting inclusive and learner-centred practices by ensuring that students of all abilities, backgrounds, and learning styles are given equal opportunities to succeed. By applying its central principles—multiple means of representation, engagement, and expression—future teacher candidates learn how to create supportive and more accessible learning environments, design adaptable curricula, and use innovative teaching methods that respect individual differences and provide equal opportunities for learning with respond to the unique needs of every student (Cast, 2022).

For pupil teachers, it is very critical to gain understanding about inclusive education practices and similarly, must know about how to apply inclusive principles in modern teacher education era. Knowing these essential skills and strategies prepare the future teachers to respond varies needs of the learners and also minimise and overcome various challenges. UDL principles supports this process by encouraging reflective thinking and continuous professional development, allowing future teachers to adjust their practices according to the changing needs of learners. At the same time, the successful implementation of UDL is largely depends on how teacher education institution addresses existing constraints such as inadequate teacher training opportunities, inadequate resources, rigid curricula structure (Krishan & Sharma, 2023). After identifying such challenges teacher education institution can produce future educators who are capable to establishing inclusive learning environment where all students are supported, encouraged to reach their full potential. Thus, incorporating UDL into teacher preparation is not merely an instructional adjustment but a transformative step toward an educational system that respects diversity and ensures that every learner has the opportunity to succeed.

REFERENCES

- [1]. Bansal, S. (2018). Understanding Teachers' Perspective of Inclusive Education for Children With Special Needs (CWSN). *International Journal of Education and Applied Social Science*, 9(01), 115-123.
- [2]. Bhatnagar, N., & Das, A. (2014). Attitudes of Secondary School Teachers Towards Inclusive Education in New Delhi, India. *Journal of Research in Special Educational Needs*, 14. (04), 255-263.
- [3]. Boothe, K.A., Lahmann, M.J., Donnell, K.A., & Hall, D.D., (2018). Applying the Principles of Universal Design for Learning (UDL) in the College Classroom. *The Journal of Special Education Apprenticeship*, 7(3), 1-13.
- [4]. CAST. (2018). *Universal Design for Learning Guidelines*.
- [5]. CAST. (2022). *About Universal Design for Learning*.
- [6]. Dos, B., Tutsoy, T., & OfLaz, O. (2019). Views of Elementary School Teachers Regarding to Inclusive Education. *Journal of Educational Sciences Research*, 9(1), 1-19.
- [7]. Entrampas, M.R.M., Sitoy, R.E., Espina, K.E., Labayan, K.I.B., Telmo, M.S., Sollano, L.L. (2024). A Study of Pre-Service Teachers' Preparedness for Inclusive Education. *International Journal of Intelligent Systems and Application in Engineering*, 12(4), 4537-4547.
- [8]. Evmenova, A. (2018), Preparing Teachers to Use Universal Design for Learning to Support Diverse Learners. *Journal of Online Learning Research*, 4(2), 147-171.
- [9]. Jackson, H.A., & Basham, J. (2024). Universal Design for Learning Instruction and Lesson Planning for Secondary Pre-Service General Educators. *International Journal of Whole Schooling*, 20(1), 1-23.

- [10]. Javed, H., Hussain, M.A., & Tufail, M., (2024). Effect of Universal Design for Learning (UDL) Embedded Project on 5th Grade Students' Academic Achievement in Science Subject. *Bulletin of Education and Research*, 46(2), 93-106.
- [11]. Krishan, S & Sharma, N. (2023). Awareness of universal design for learning (UDL) among teachers in India. *Journal of Educational Technology Development and Exchange*, 16(1), 108-125
- [12]. Mohanty, S.P., & Nanda, N. (2017), Inclusive Practices in Elementary Education: What do the Heads of Schools Perceive? I- manager *Journal of School Educational Technology*, 12(04), 15-23.
- [13]. Musayroh, S., Maryanti, R., & Maulidina, C. A. (2023). Attitudes of Elementary School Teachers Towards Inclusive Education: Implementation of SACIE- R Scale. *Jurnal Basicedu*, 7(5), 3166-3171.
- [14]. Pati, A, &Khami, J. (2022), A Study on Challenges facing the implementation of inclusive Education in elementary level of Malkangiri District of Odisha State. *International Journal of Applied Research*, 8(02),82-85.
- [15]. Priyadharshini, V., & Mary, R.S., (2024). Universal Design for Learning (UDL) in Inclusive Education: Accelerating Learning for All. *International Journal of Arts, Science and Humanities*, 11(4), 145-150.
- [16]. Siron, Y., & Malyono, R. (2017). Implementing Inclusive Education: What are Elementary Teachers' Obstacles? Case Study in East Jakarta, Indonesia. *Advance in Social Science, Education and Humanities Research*, 153, 177-180.
- [17]. Sharma, B.U., (2024). Impact of Universal Design for Learning (UDL) on Student Engagement and Achievement in Inclusive Education. *International Journal of Novel Research and Development*, 9(8), d173-d176.
- [18]. Yilmaz, R.K., & Yeganeh, E., (2022), Who and How Do I Include? A Case Study on Teachers Inclusive Practices. *International Journal of Progressive Education*, 17. (02), 406-430.