

APPLYING UNIVERSAL DESIGN FOR LEARNING IN ORGANIZING INSTRUCTION FOR STUDENTS WITH DISABILITIES IN INCLUSIVE PRIMARY SCHOOLS

Nguyen Ha My*, Nguyen Thi Cam Huong and Nguyen Thi Hoa

Hanoi National University of Education, Hanoi, Vietnam

*Corresponding author: Nguyen Ha My, e-mail: nhmy@hnue.edu.vn

Received October 26, 2025. Revised October 22, 2025. Accepted March 16, 2026.

Abstract. To enhance the quality of inclusive education for students with disabilities, teachers continuously innovate teaching methods. Universal Design Learning (UDL), a framework to improve and optimize teaching and learning, is encouraged to be applied in inclusive education. This article proposes a four-step process including lesson planning, UDL-based adjustment, implementation, and reflection. In this process, adjusting lesson plans according to UDL guidelines is important in promoting the effectiveness of inclusive education. At that time, teachers need to consider the overall needs of students in the class, including students with disabilities, then use the UDL guideline framework to review and determine teaching objectives and teaching content, and at the same time select and adjust appropriate methods, means, forms, and assessment methods to meet the diverse needs of students. Findings highlight that integrating UDL principles enhances accessibility, student engagement, and teacher flexibility in inclusive classrooms. These suggestions are considered as an open direction for implementing effective inclusive education in primary schools today.

Keywords: Universal Design for Learning, organizing teaching activities, inclusive primary school, students with disabilities.

1. Introduction

Universal Design for Learning (UDL) is an educational framework grounded in research on learning theories, including cognitive neuroscience, aimed at developing flexible learning environments and spaces that can accommodate individual differences in learning [1]. This framework provides specific guidelines for designing and organizing lessons that are accessible and effective for students with diverse abilities. This means that every student can participate and learn with an equal sense of experience. Inclusive education requires teachers to be creative, proactive, and collaborative, providing and creating comprehensive, balanced, and general knowledge for students while always meeting their diverse needs. Therefore, applying for UDL in inclusive education is essential. Several studies on the use of UDL in classrooms have been conducted. Margaret M. Flores (2008) noted that the UDL framework can help elementary and middle school teachers design accessible classroom environments and instruction for all students, including those with disabilities [2]. Lowrey et al. (2017) conducted a qualitative study in the United States on implementing UDL in inclusive classrooms [3]. The study indicated that UDL

activities support the learning of all students, including those with and without disabilities, by providing multiple ways for students to access and engage with the curriculum [3]. Coyne et al. (2017) demonstrated that the UDL framework offers a proactive approach to designing inclusive learning environments that meet the diverse needs of all students [4]. Researchers such as Edyburn (2021), Roski et al. (2021), and Kelly et al. (2022) have explored UDL's role in fostering inclusion, particularly in outdoor learning settings [5] [6] [7]. Studies by Edyburn (2021) examined educational inclusion through UDL, offering alternative teaching training programs and strategies [5]. According to Kapil et al. (2024), UDL assists educators in minimizing barriers and enhancing learning opportunities for all students, including those with disabilities, and by reducing obstacles to instruction, UDL enables all learners to access, participate in, and progress through the General Education Curriculum [8]. In Vietnam, author Nguyễn Thị Cẩm Hường et al. (2022) explored ways to apply UDL in inclusive education to meet the requirements of the 2018 General Education Curriculum [9]. Some research on the application of UDL in inclusive education has begun to be implemented [10] [11].

Organizing instruction for students with disabilities in inclusive primary schools based on UDL principles is becoming an important educational trend, especially in the context of general schools where students with disabilities participate in inclusive education. UNICEF (2014) pointed out that UDL not only ensures that students with disabilities have equal access to education but also enables all students to maximize their potential through flexible and innovative teaching methods [12]. The principles of UDL aim to help teachers meet the diverse needs of students, including all students with disabilities in inclusive classrooms.

These studies collectively affirm that UDL is an effective pedagogical framework for addressing learner diversity. However, most of the existing research has been conducted in Western contexts, where infrastructure, class size, and teacher training conditions differ significantly from those in developing countries. In Vietnam, inclusive education has been promoted nationally, yet the practical application of UDL principles remains limited. This study aims to contextualize UDL implementation in the Vietnamese primary education system, offering a process adapted to local realities and teacher capacities, while also suggesting specific ways to integrate objectives, content, methods, tools, and teaching formats to support primary school teachers in inclusive education, thereby improving the quality of education for all students, especially those with disabilities.

2. Content

2.1. Overview of Universal Design for Learning

Each individual possesses diverse characteristics, manifested through differences in intellectual, physical, emotional, and behavioral domains, as well as in social status, ethnicity, culture, and gender, thereby exerting a comprehensive influence on all aspects of human life. In the classroom, each student also has diverse characteristics, and teachers are responsible for teaching all students in the class. The diversity in characteristics and conditions of learners in a classroom requires teachers to have the ability to design learning activities that are appropriate and meet the learning needs of all students. Limitations in teachers' ability to design learning activities that address the needs and abilities of all learners will result in only some students succeeding while others face difficulties in acquiring knowledge, forming, and developing essential competencies.

In the early 1990s, David H. Rose and colleagues at the Center for Applied Special Technology (CAST) developed a method for designing learning activities to meet the learning needs of all students. This method is called Universal Design for Learning (UDL) [13]. UDL is an educational framework that aims to create inclusive learning environments accessible to all

students, including those with disabilities [14]. Based on neuroscience research and technology, UDL principles help design flexible curricula that accommodate diverse learning needs in higher education [15]. Studies show that UDL strategies enhance learning outcomes for all students, particularly those with disabilities in STEM fields [16] [18]. Implementation of UDL in course redesign has demonstrated positive results, with faculty members successfully integrating these principles into large-enrollment courses [15]. Research indicates that students with and without disabilities find UDL principles useful in improving their learning experience and reducing barriers to education [17]. By providing equal access to learning, not just information, UDL allows students to control their method of accessing content while educators monitor the learning process [14]. In Nelson's study, UDL is described as a guiding framework that can support educators in designing learning activities suitable for all students [7]. UDL includes three principles, developed based on research in cognitive neuroscience and the learning process, with the third principle focusing on providing multiple ways to present information, act, express, and engage [8]. Successful implementation of UDL in primary schools relies on effective collaboration between clients, architects, and users throughout the design process, as well as a focus on understanding diverse user needs beyond minimum requirements [18].

From a research perspective, UDL is not only a practical tool but also a theoretical model for exploring how students learn in diverse contexts. Recent studies have begun to use meta-analysis to evaluate the effectiveness of UDL, showing a moderate positive impact on learning outcomes [19]. However, there remains a gap in measuring the long-term impact of UDL on social and emotional aspects, particularly for students with disabilities.

While UDL principles provide a strong theoretical foundation, their practical application in Vietnamese inclusive classrooms requires adaptation. Many primary teachers in Vietnam face challenges such as large class sizes, limited teaching aids, and diverse levels of student readiness. Applying UDL, therefore, demands simplified guidelines and examples that reflect the socio-cultural and educational realities of Vietnamese schools.

2.2. Organizing Instruction Based on Universal Design for Learning Principles in Primary Education

The primary education teaching process is one in which, under the leading role (organizing, directing, and guiding) of the teacher, students consciously and actively organize and manage their cognitive activities to effectively fulfill primary education learning tasks. The teaching process involves two main activities: the teacher's teaching activities and the students' learning activities. In teaching activities, the teacher plays an active role in organizing and directing to enable students to access content, information, and materials through the introduction, arrangement, display, and presentation of information (representation). Conversely, students access, process, and comprehend information (engagement) and present, express, or demonstrate results (expression). This characteristic reflects the diversity in cognitive, emotional, and behavioral abilities of primary school students, requiring a flexible approach to meet varied learning needs. The core principles of UDL emphasize multimodal presentation, flexible learning materials, and removing learning barriers for all.

Based on UDL principles, UDL promotes inclusion by adapting curriculum and teaching methods to meet various social, emotional, physical, cognitive, and cultural needs [7]. Implementation of UDL principles in primary education has shown positive results, enriched the teaching-learning process and received favorable responses from students. UDL can be effectively applied to outdoor learning, promoting experiential and child-initiated learning while addressing diverse needs [7]. Teachers can incorporate UDL principles into lesson planning and curriculum design to create a more inclusive and effective learning environment [20]. This approach helps students develop essential skills such as goal setting, comprehension, and self-

regulation while allowing for flexible assessment options [20].

CAST (2014) provided specific guidelines for implementing the three UDL principles, summarized as follows [13]:

- Principle 1 (Multiple Means of Representation – 12 guidelines) emphasizes presenting information through varied modalities such as text, visuals, and audio to ensure accessibility for all learners.

- Principle 2 (Multiple Means of Action and Expression – 9 guidelines) focuses on allowing students to demonstrate understanding in flexible ways – through writing, speaking, or performance.

- Principle 3 (Multiple Means of Engagement – 10 guidelines) targets motivation and participation, encouraging autonomy, relevance, and collaboration in learning.

UDL is suitable for primary education because it emphasizes removing learning barriers through multimodal content and flexible materials, enabling teachers to optimize teaching activities and encouraging students to self-regulate their learning. For primary school students, who are in the early stages of cognitive development and easily influenced by how information is presented and their level of interest, UDL provides an ideal framework for teachers to organize effective instruction. In the teaching process in inclusive primary classrooms for students with disabilities, organizing instruction based on the three UDL principles occurs under the teacher's leadership, who organizes, directs, and guides, while students actively and consciously participate in cognitive activities to complete learning tasks. The teaching activities (presenting information - representation) and the students' learning activities (receiving information - engagement, expressing results - expression) form a tightly linked sequence, requiring the integration of all three UDL principles to meet diverse needs and remove learning barriers for all students, especially those with disabilities. Organizing instruction for students with disabilities in inclusive settings stems from UDL's core philosophy of creating a flexible learning environment where all students can access content, participate in activities, and maintain learning motivation. For example, when teaching a topic on "Getting acquainted with some shapes" (Maths 1) in an inclusive classroom, the teacher must not only present content through multiple modalities (images, models, speech) but also design ways for students with intellectual disability to demonstrate understanding (drawing, assembling shapes, responding with gestures) and spark interest (games, task choices). If only one principle is applied, such as focusing solely on diverse presentation while neglecting how students express or their motivation to engage, the learning effectiveness will be limited, particularly for students with disabilities who have specific needs.

Organizing instruction based on the three UDL principles in inclusive primary classrooms holds significant value. It ensures true inclusion by creating conditions for all students, regardless of physical or cognitive limitations, to learn together in a fair environment. The simultaneous integration of the three principles fosters the comprehensive development of competencies such as thinking, communication, and self-management, while also building a positive attitude toward learning - a key goal of primary education. Moreover, UDL supports teachers in optimizing teaching in diverse classroom settings, particularly when implementing the 2018 General Education Curriculum in Vietnam.

Organizing instruction based on the three UDL principles in inclusive primary classrooms is an integrated process in which diverse presentation, flexible expression, and engagement stimulation are applied simultaneously to meet students' diverse needs. This approach not only enhances teaching effectiveness but also promotes comprehensive and equitable development for all students, especially those with disabilities. In the context of inclusive primary education, UDL serves as a proactive strategy for designing learning environments from the outset, rather than retrofitting as in traditional methods [21] [4]. Scientific research indicates that UDL can improve learning outcomes by minimizing barriers and enhancing student autonomy [3] [17]. However,

implementing UDL requires teachers to have the ability to analyze students' diverse needs, design multimodal materials, and make real-time adjustments [20] [22].

2.3. Process for Organizing Instruction in Inclusive Primary Schools Based on Universal Design for Learning Principles

Based on the implementation of UDL principles described, it is evident that to organize instruction in inclusive primary schools based on UDL principles, all three principles must be ensured in every component of the teaching process.

The scientific basis for proposing the process of organizing instruction in inclusive primary schools based on UDL principles includes foundations from neuroscience. UDL, the foundation of this process, was developed by Rose D. H. and colleagues at CAST based on research in the neuroscience of learning [1]. According to Mayer, A., Rose, D. H., & Gordon, D. (2014), the three UDL principles correspond to three main neural networks in the brain: the Recognition Networks, related to receiving information, activated when teachers provide content through multiple modalities (audio, images, symbols); the Strategic Networks, which control action and expression, supporting students in demonstrating knowledge in ways suited to their abilities; and the Affective Networks, which influence motivation and engagement, activated when teachers foster motivation and maintain learning interest [21]. This neuroscientific foundation explains why UDL can effectively address the cognitive and emotional variability of learners. For students with disabilities in inclusive Vietnamese classrooms, these networks highlight the need to design lessons that simultaneously support perception, action, and motivation rather than focusing solely on content delivery. Such integration is essential to foster equitable participation and engagement.

Additionally, the process of organizing instruction based on UDL principles is grounded in modern learning theories. According to Piaget and Vygotsky's constructivist theory, students construct knowledge through experiences and social interactions [23]. Students are encouraged to actively participate in learning activities, and teachers adjust based on feedback, aligning with the student-centered learning perspective. Vygotsky's Zone of Proximal Development (ZPD) theory emphasizes the teacher's role in supporting student progress [24]. Teachers must adjust objectives and content according to Bloom's cognitive levels, ensuring learning tasks fall within the ZPD of each student, especially students with disabilities in inclusive classrooms. Zimmerman's self-regulation theory posits that students develop self-management skills through planning, execution, and reflection [25]. The process must integrate self-regulation elements by guiding students in planning, self-monitoring activities, and encouraging teachers to assess student engagement, fostering individual competency development.

Below is the process for organizing instruction in inclusive primary schools with students with disabilities in the context of Vietnam based on UDL principles:

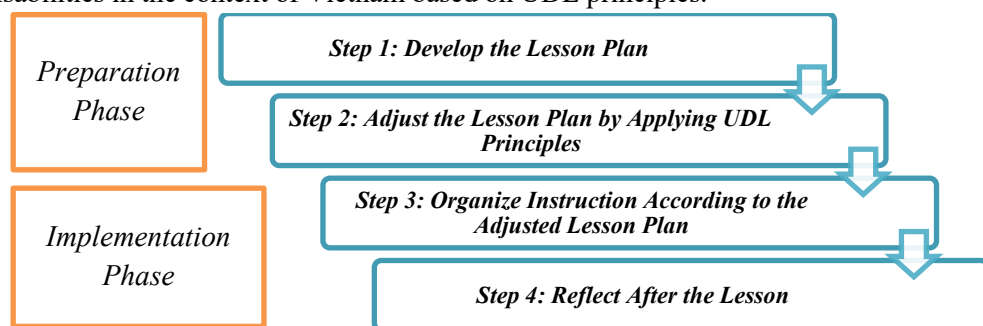


Figure 1. The process for organizing instruction in inclusive primary schools based on UDL principles

In which:

** Preparation Phase:*

Step 1: Develop the Lesson Plan

In this step, the teacher develops a specific lesson plan for the entire class based on the General Education Curriculum through identifying target students, required learning outcomes of the lesson, qualities and competencies students can develop in the lesson, learning content of the lesson according to the subject curriculum, teaching methods, tools, and formats to design corresponding teaching-learning activities aligned with the lesson's content, and assessment methods for students in each teaching activity and throughout the lesson.

Step 2: Adjust the Lesson Plan by Applying UDL Principles

In this step, the teacher reviews the guidelines of the three UDL principles in relation to the components and contents of the lesson plan and adjusts the lesson plan according to these principles.

Before adjusting the lesson plan, the teacher revisits the meaning of each UDL principle:

- Apply UDL Principle 1 to provide and deliver information when assigning tasks, explaining, guiding students with disabilities, providing additional instructions, supporting students, summarizing activities, and drawing conclusions in the designed teaching-learning activities.
- Apply UDL Principle 2 to incorporate ways for students with disabilities to present, express, and demonstrate information in the designed teaching-learning activities.
- Apply UDL Principle 3 to motivate and encourage students with disabilities in the designed teaching-learning activities.

The teacher adjusts the lesson plan as follows:

- Review and further specify the characteristics, strengths, and learning barriers of students with disabilities to ensure appropriate support within the inclusive classroom.
- Revise lesson outcomes and wording to reflect UDL principles, differentiate for individual learners' needs, and clearly communicate goals to enhance student understanding and engagement.
- Adjust the learning contents and its presentation to ensure accessibility and flexibility in accordance with UDL principles.
- Modify activity structures, methods, and assessments to promote motivation, participation, and equitable learning opportunities for all students, including students with disabilities.
- Review and design teaching materials and tools consistent with UDL principles to support inclusive instruction.

** Implementation Phase:*

Step 3: Organize Instruction According to the Adjusted Lesson Plan

The teacher follows the adjusted lesson plan to organize instruction. The teacher assesses the level of achievement of the required outcomes while observing and noting how students receive, participate, and express themselves in the classroom, as well as any unforeseen factors, to use as references when developing subsequent lesson plans.

Step 4: Reflect After the Lesson

The teacher adjusts the lesson plan after implementing inclusive instruction based on the designed lesson and student feedback, while ensuring the application of the three UDL principles in all components of the teaching process. The teacher reviews the implementation of the UDL-based lesson plan and uses self-assessment questions to reflect on the lesson, reviews the UDL elements that worked well, and identifies remaining issues in the lesson, as well as barriers students still encountered (in specific student cases). Some questions that can be used to assess the effectiveness of UDL application include:

- How flexible was the learning environment to ensure students learned comfortably, safely, and equitably?
- How did the teacher establish clear learning objectives with students?
- How did the learning content reflect diversity to accommodate students' varied levels?
- How did the teaching methods support student learning?
- How were the tools used for students?
- How did the teacher combine various assessment methods? Did the teacher provide timely feedback during the students' learning process?

Based on this, the teacher plans changes and adjustments for subsequent lesson plans.

The proposed instructional organization process demonstrates a structured approach, ensuring the simultaneous integration of the three UDL principles throughout the preparation and implementation phases. From a theoretical perspective, this process reflects the core principle of UDL, which is grounded in neuroscience regarding how the brain processes information through recognition, strategic, and affective networks [10]. Requiring the application of all three principles to every component of the teaching process, from planning to reflection, affirms that UDL is not merely a set of tools, but a comprehensive system aimed at optimizing the learning process in inclusive primary classrooms. The coherence of the process lies in the transition between steps, starting with developing a lesson plan based on the General Education Curriculum, then enhancing it through UDL adjustments to meet the diverse needs of students with disabilities. The implementation phase, with activity organization and reflection, strengthens the connection between theory and practice, allowing teachers not only to apply but also to evaluate the effectiveness of UDL in specific contexts. The guiding value of this process lies in its provision of a clear reference framework, helping inclusive primary school teachers shape a personalized and holistic teaching approach, thereby building a foundation for students' competency development aligned with modern educational goals.

2.4. Discussion

The proposed two-phase process, consisting of four steps, provides a systematic approach to integrating UDL principles into organizing instruction in inclusive primary schools with students with disabilities. Adjusting lesson plans according to the three UDL principles (diverse representation, diverse expression, and engagement stimulation) not only ensures that students with disabilities can access learning content but also enables all students to maximize their potential, as highlighted by UNICEF (2014) [12]. In particular, the reflection step after the lesson allows teachers to continuously improve their teaching methods based on real-time feedback from students, enhancing the flexibility and effectiveness of the teaching process in the diverse context of inclusive classrooms.

Compared to existing studies, this process shares similarities in emphasizing the proactive nature of UDL in designing learning environments that meet diverse needs. However, its distinct feature lies in its specific focus on inclusive primary schools in Vietnam, where infrastructure and teacher capacity may be limited compared to developed countries. The proposed process not only concretizes the application of UDL but also integrates practical elements such as coordination between individual and group activities, the leading role of teachers, and the utilization of available infrastructure, making it more suitable for the real conditions of inclusive primary schools in Vietnam.

Despite its potential benefits, implementing this process in inclusive primary schools in Vietnam may face several challenges, such as the requirement for teachers to have skills in analyzing the diverse needs of students with disabilities. Adjusting lesson plans according to UDL demands high professional expertise and significant preparation time, while primary school

teachers often face workload pressures. Infrastructure in many Vietnamese primary schools, especially in rural areas, may not fully support the diverse tools required (e.g., technological devices, speech-to-text software) as proposed by CAST (2014) [13]. Additionally, coordination between teachers and students in organizing group activities or self-assessment requires students to have a certain level of self-management skills, which can be challenging for primary school students, particularly those with disabilities in inclusive settings.

The process allows teachers to adapt based on classroom characteristics and the types of disabilities students may have (e.g., visual, auditory, motor, or intellectual disabilities). This reflects Nelson's perspective that UDL is a flexible guiding framework, customizable to the specific needs of individual students [20]. However, for effective implementation, support from schools (teacher training and provision of materials) and collaboration from parents are necessary to ensure consistency in supporting students with disabilities.

3. Conclusion

The study has proposed a process for organizing instruction based on UDL principles in inclusive primary schools with students with disabilities, closely integrating UDL theory with the practical educational context in Vietnam. The study's contribution lies in providing a flexible, practical framework that enables teachers to design learning environments that meet diverse needs, thereby enhancing participation and comprehensive development for students with disabilities and the entire inclusive classroom. The process emphasizes the reflective role of teachers, enabling them to adjust teaching methods based on real-world observations and student feedback, thus improving instructional quality. In the context of the 2018 General Education Curriculum, this is a supportive tool for teachers, leveraging existing infrastructure and community collaboration. However, for effective large-scale implementation, experimental studies are needed to evaluate real-world impacts, alongside investments in teacher training and the development of in-depth UDL guidelines for inclusive education of students with disabilities, ensuring the feasibility and sustainability of this approach in inclusive education.

REFERENCES

- [1] Rose, D. H., Meyer, A. (2002). *Teaching every student in the digital age: Universal Design for Learning*. Alexandria, VA: Association for Supervision and Curriculum Development. ISBN 0-87120-599-8
- [2] Flores, M. M. (2008), Universal Design in Elementary and Middle School: Designing Classrooms and Instructional Practices to Ensure Access to Learning for All Students, *Childhood Education*, 84(4), 224–229. <https://doi.org/10.1080/00094056.2008.10523013>
- [3] Lowrey, K. A., Hollingshead, A., Howery, K., & Bishop, J. B. (2017). More than one way: Stories of UDL and inclusive classrooms. *Research and Practice for Persons with Severe Disabilities*, 42(4), 225–242 <https://doi.org/10.1177/1540796917711666>
- [4] Coyne, P., Evans, M., & Karger, J. (2017). Use of a UDL literacy environment by middle school students with intellectual and developmental disabilities. *Journal of Intellectual and Developmental Disabilities*, 55(1), 4–14. <https://doi.org/10.1352/1934-9556-55.1.4>
- [5] Edyburn D, (2021). Achieving the Transformational Vision for Universal Design for Learning: Guest Associate Editor Introduction. *Intervention in School and Clinic*, 56(3), 177-178. <https://doi.org/10.1177/105345122094219>
- [6] Roski, M., Walkowiak, M., Nehring, A., (2021). Universal Design for Learning: The More, the Better, *Education Sciences*, v11 Article 164. <https://doi.org/10.3390/educsci11040164>
- [7] Kelly, O., Buckley, K., Lieberman, L. J., Katrina, A. (2022). Universal Design for Learning - A Framework for Inclusion in Outdoor Learning, *Journal of Outdoor and Environmental Education*, V25 N1 pp. 75-89. <https://doi.org/10.1007/s42322-022-00096-z>

- [8] Kapil, Y., Sujathamalini, J., Halder, T. (2024), Effectiveness of universal design of learning for students with mild intellectual disabilities – a review. *International Journal of Research and Review*, 11(3): 271-280. DOI: <https://doi.org/10.52403/ijrr.20240335>
- [9] Nguyen TCH, Pham TT, Bui THV & Nguyen HY (2022). Universal Design in Learning: Solution for inclusive education for children with disabilities. *Journal of Education – Ministry of Education and Training*, 22(10), 29-34. Retrieved from <https://tcgd.tapchigiaoduc.edu.vn/index.php/tapchi/article/view/428> (Vietnamese)
- [10] Nguyen TCH, Nguyen HM, Nguyen TH, Do TTT, Dinh NTT, Bui TH & Do TT, (2024), Applying Universal Design for Learning (UDL) in Inclusive Primary Education for Students with Disabilities, *Hanoi National University Press*, ISBN 978-604-43-3647-3 (Vietnamese)
- [11] Tran TBN, Nguyen HM & Nguyen MP (2024), Universal Design for Learning (UDL) Application in the Design of Learning Environment to Ensure Equity in Inclusive Primary Education, *HNUE Journal of Science*, Volume 69, Issue 5A, pp. 34-42 <https://doi.org/10.18173/2354-1075.2024-0078a> (Vietnamese)
- [12] UNICEF, (2014). Access to School and the Learning Environment II – Universal Design for Learning – *Webinar 11 – Companion Technical Booklet*. Retrieved from https://www.unicef.org/northmacedonia/media/4121/file/MK_AccessToLearning_II_Report_ENG.pdf
- [13] CAST. (2014). The Three Principles of UDL. Retrieved Oct 15, 2024, Retrieved from <http://www.udlcenter.org/aboutudl/whatisudl/3principles>
- [14] Edyburn, D.L. (2005). Universal Design for Learning. *Special Education Technology Practice*, 7(5), 16-22. Reprinted with permission. Retrieved from https://ocali.org/storage/ocali-ims-sites/ocali-ims-ocali/documents/UDL_SETP7.pdf
- [15] Parker H.B. (2012). "Learning Starts with Design: Using Universal Design for Learning (UDL) in Higher Education Course Redesign". Miller, F.S. (Ed.) *Transforming Learning Environments: Strategies to Shape the Next Generation (Advances in Educational Administration, Vol. 16)*. Emerald Group Publishing Limited, Bingley, pp. 109-136.
- [16] Izzo, M. V. (2012). Universal Design for Learning: Enhancing achievement of students with disabilities. *Procedia computer science*, 14, 343-350. doi: 10.1016/j.procs.2012.10.039
- [17] Black, R., Weinberg, L., & Brodwin, M.G. (2015). Universal Design for Learning and Instruction: Perspectives of Students with Disabilities in Higher Education. *Exceptionality education international*, 25, 1-26. <https://doi.org/10.5206/eei.v25i2.7723>
- [18] Denizou, K. (2022). Universal Design in Primary Schools. *Studies in health technology and informatics*, 297, 525-532. DOI: 10.3233/SHTI220883
- [19] King-Sears, M. E., Stefanidis, A., Evmenova, A. S., Rao, K., Mergen, R. L., Owen, L. S., & Strimel, M. M. (2023). Achievement of learners receiving UDL instruction: A meta-analysis. *Teaching and Teacher Education*, 122, Article 103956. <https://doi.org/10.1016/j.tate.2022.103956>
- [20] Nelson, L. L. (2014). Design and Deliver: Planning and Teaching Using Universal Design for Learning. *Baltimore: Paul H. Brookes Publishing*. ISBN 1598573829, 9781598573824
- [21] Mayer, A., Rose, D. H., & Gordon, D. (2014). Universal Design for Learning: Theory and Practice, *Wakefield: CAST Professional Publishing*. ISBN: 9780989867412
- [22] Rao, K., Smith, S. J., Evmenova, A. S., & Edyburn, D. (2023). Effects of a Universal Design for Learning (UDL) training course on the development teachers' competences: A systematic review. *Education Sciences*, 13(4), 219-230. <https://doi.org/10.3390/educsci13040219>
- [23] Schunk, D. H. (2016). Learning theories: An educational perspective (7th ed.). Boston, MA: Pearson Education. ISBN 978-0133599725
- [24] Vygotsky, L. S. (1986). *Thought and language*. (A. Kozulin, Ed. & Trans.). Cambridge, MA: MIT Press. (Original work published 1934). ISBN 9780262720106
- [25] Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. Trong M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). San Diego, CA: Academic Press. <https://doi.org/10.1016/B978-012109890-2/50031-7>