

Effectiveness of Universal Design of Learning for Students with Mild Intellectual Disabilities - A Review

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ABSTRACT

A special education programme is required for kids who have intellectual disabilities. To help these kids learn how to cooperate while engaging in activities, various activities like music, dance, yoga arts and crafts etc. may be offered. They need to teach practical skills and daily tasks rather than academic knowledge. The misconception is that institutional training is the only way to teach children with intellectual disabilities. To learn about autonomous living, they require attention and inclusion. The Govt also offers additional services and educational opportunities for children with intellectual disabilities. Universal Design for Learning (UDL) is a framework that assists educators in minimizing obstacles and enhancing learning opportunities for every student. It is an instructional approach designed to cater to the diverse needs and capabilities of all learners, eliminating unnecessary challenges in the learning journey. Several pieces of literature have been published, illustrating the efficacy of Universal Design for Learning (UDL) in enhancing learning across various subjects for children with intellectual disabilities. Evidence suggests that UDL aids in accessing the general education

curriculum, resulting in improved learning outcomes and growth in essential skills such as reading, writing, comprehension, decision-making, life skills, and social skills. These advancements are pivotal in enabling students to lead dignified and standard lives. Researchers in the field recommend further investigation to solidify the evidence supporting the assertions made in this paper.

Keywords: Universal design of learning, Children with intellectual disabilities, Autonomous, Hurdles

AN OVERVIEW

Universal Design for Learning (UDL) serves as a framework that assists educators in minimizing barriers and enhancing learning opportunities for all students. By reducing obstacles to instruction, UDL enables all learners to access, participate in, and progress through the general education curriculum. It optimizes teaching and learning based on scientific insights into human learning processes. This approach caters to the requirements and capabilities of every learner, eliminating unnecessary obstacles in the learning journey.

Classroom Universal Design for Learning (UDL) is grounded in three evidence-based principles:

Multiple Means of Representation: This principle involves offering learners various avenues for acquiring information and knowledge. By providing multiple ways of presenting content, such as visual aids, auditory explanations, and tactile experiences, educators can accommodate diverse learning styles and preferences.

Multiple Means of Expression: This principle focuses on providing learners with alternatives for demonstrating their understanding and knowledge. By offering various means of expression, such as written assignments, oral presentations, artistic projects, or multimedia creations, educators empower students to showcase their learning in ways that best suit their strengths and abilities.

Multiple Means of Engagement: This principle aims to tap into learners' interests, challenge them appropriately, and motivate them to learn. By offering diverse and stimulating learning experiences, educators can engage students emotionally and cognitively, fostering a positive and inclusive learning environment.

These principles, as outlined by Basham, Edyburn, Lowrey, and Wissick (2007), form the foundation of UDL in the classroom, promoting equity, flexibility, and accessibility for all learners. Universal Design of Learning (UDL) for children with Mild Intellectual Disabilities (Mild Intellectual D)

Universal Design for Learning for children with mild intellectual disabilities

Students with mild intellectual disabilities often lag behind their peers by 2–4 years in academic performance. This condition can impact various aspects such as speech development, memory, attention span, and overall academic achievement. Due to these challenges, lesson modifications are frequently necessary for these students, and in some cases, they may require placement in special education settings.

Teachers must adapt various teaching methods when working with students who have intellectual disabilities. Incorporating Information Technology (IT) is one such method. Educators must focus on integrating and advancing IT in educational settings to support the implementation of the Universal Design for Learning (UDL). To achieve this, teachers need to familiarize themselves with the different aspects of IT to effectively leverage its benefits.

By integrating innovative teaching methods while adhering to the principles of Universal Design for Learning, teachers can significantly enhance the learning capacity and knowledge attainment of students with intellectual disabilities. The ultimate goal of UDL is to ensure equal opportunities for all students to engage in and access general education. As a result, students with intellectual disabilities experience increased confidence and accelerated progress.

Furthermore, the adoption of Universal Design for Learning may prompt the establishment of stringent legal frameworks governing key decision-making processes related to teacher hiring, curriculum selection, and instructional strategies. These frameworks, as suggested by Edyburn (2010), aim to ensure that educational practices are inclusive and equitable for all learners, including those with disabilities.

Objectives

The current review aims to provide insight into Universal Design for Learning (UDL) and Inclusive Education for children with Mild Intellectual Disabilities, with the following objectives:

- To comprehend the scope of research conducted concerning various facets of Universal Design for Learning (UDL) and Education for children with Mild Intellectual Disabilities.
- To conduct a thorough investigation into Universal Design for Learning (UDL) and Education for children with Mild Intellectual Disabilities.

METHODOLOGY

This study relies on secondary data analysis. It provides an overview of the current status of Universal Design for Learning (UDL) and Inclusive Education for children with Intellectual Disabilities through a review of existing literature. Research studies and articles sourced from diverse outlets such as books, journals, websites, and other resources were consulted for this purpose. However, it is important to acknowledge that the review has limitations, particularly in terms of the availability and accessibility of the literature considered.

REVIEW OF LITERATURE

To ensure that all students, regardless of their cognitive abilities, have access to a fundamental education, integrating a universal design for learning framework can be highly advantageous. Access to general education ensures enhanced learning outcomes and development in various areas such as reading, writing, comprehension, decision-making, life skills, and social skills, thereby enabling students to lead fulfilling and dignified lives.

In this study, the author delved into the realm of Universal Design for Learning (UDL) and its significance and efficacy in teaching children with mild intellectual disabilities.

Studies related to mild intellectual disability

The studies examined the nature and traits associated with children who have mild intellectual disabilities. Numerous investigations focused on understanding the learning patterns of these children, while others provided insights into their social interactions with peers. Within this domain, the reviews encompassed the needs, significance, and factors contributing to challenges in communication and grasping learning concepts among children with mild intellectual disabilities.

Brankaer et al., (2011) conducted a study examining numerical magnitude processing in children with mild intellectual disabilities (MID). The primary aim was to investigate

whether these children encounter challenges in representing numerical magnitudes or accessing them from formal symbols.

The researchers compared the performance of 26 children with MID on both symbolic (digits) and non-symbolic (dot-arrays) comparison tasks with two control groups: one matched for chronological age and another matched for mathematical ability level.

The findings indicated that children with MID performed less effectively compared to their typically developing peers matched for chronological age on both symbolic and non-symbolic comparison tasks. However, their performance did not significantly differ from the control group matched for mathematical ability level.

These results suggest that children with MID experience a delay in the development of numerical magnitude representation. This pattern was evident in both symbolic and non-symbolic comparison tasks, with slightly more pronounced difficulties observed in the symbolic task.

Based on these findings, interventions for children with MID should aim to facilitate the development of magnitude representations and enhance the connections between symbols and the magnitudes they represent.

Blasi et al., (2019) The study examined the reading skills of children with mild to borderline intellectual disabilities, focusing on second to eighth-graders. It aimed to analyze various aspects of reading fluency, accuracy, and comprehension in Italian children with borderline intellectual functioning (BIF) or mild intellectual disability (MID). The research employed a cross-sectional design, involving a sample of 168 children with mild intellectual disabilities and 106 children with borderline intellectual disabilities.

Using standardized scores, the study compared the performance of these groups with normative values. The findings revealed that children with intellectual disabilities generally scored lower compared to the norms, with those having MID facing greater

challenges than those with BIF. The difficulties were more pronounced in reading speed than accuracy measures, and in reading words compared to pseudo-words. Moreover, these difficulties tended to escalate as students progressed through the grades.

The study also noted significant individual differences regardless of the MID-BIF subgroup, stimulus category, or reading parameter. Overall, children with intellectual disabilities encountered obstacles in reading acquisition, particularly pronounced in those with more severe intellectual disabilities. However, substantial individual variations were evident among children with both BIF and MID.

Interestingly, the study found that pseudo-word reading skills were relatively preserved, suggesting efficient utilization of the grapheme-to-phoneme conversion routine. However, this processing mode might become less effective in higher grades, especially in regular orthographies like Italian, where typically developing children rely more on lexical activation.

Bouck et al. (2020) undertook a study focusing on learning fractions using a virtual manipulative-based graduated instructional sequence. The primary objective was to investigate how this virtual abstract instructional sequence influenced the acquisition and retention of fraction skills among three middle school students with mild intellectual disabilities.

The study revealed a notable correlation between the visual abstract instructional sequence and understanding equivalent fractions with unlike denominators, contingent upon the individual characteristics of students with mild intellectual disabilities. This suggests that the effectiveness of the virtual manipulative-based graduated instructional sequence varied depending on the specific needs and abilities of the students involved.

Chatenoud et al. (2020) delved into the impact of three combined reading instruction methods on the reading proficiency of adolescents with mild intellectual disability

(ID). As these students transition to high school, they often encounter challenges in comprehending complex texts, which significantly affects their academic performance. At this stage, the focus shifts from learning to read to reading for comprehension across various subjects.

Despite the critical need for effective reading comprehension strategies for adolescents with ID, there has been limited research offering guidance on implementing evidence-based instruction. This study aimed to address this gap by introducing an intervention design that combines three reading instruction devices tailored to students with mild intellectual disabilities (MID). Developed through collaborative research efforts, this approach demonstrated promise in experimental settings.

Although the outcomes didn't entirely align with expectations of significant improvements in comprehension, the intervention did yield notable effects, particularly concerning phonics and accuracy. These findings underscore the potential of tailored reading instruction methods in enhancing reading proficiency among adolescents with MID, shedding light on avenues for further research and instructional development in this domain.

Flanagan & Morgan (2021) directed their attention towards ensuring equitable access to online learning for all students by employing universal learning design (UDL) principles. Educators face the challenge of supporting diverse learners, including those with Hidden Impairments (HIDs) such as learning disabilities, mild intellectual disabilities, emotional-behavioural disorders, and attention-deficit hyperactivity disorder (ADHD), while addressing their unique educational requirements. Students with HIDs often encounter difficulties in completing grade-level tasks, particularly in areas such as reading, writing, and mathematics.

While technology holds promise for providing differentiated instruction to support students with HIDs, online or partially online instruction may introduce

additional obstacles in academic domains. Similar to traditional in-person instruction, educators can integrate the principles of Universal Design for Learning (UDL) into the design of online learning experiences for students with HIDs.

This approach aims to create flexible and inclusive learning environments that cater to diverse learner needs, promoting equitable access and participation in online education. **Fusinska & Gacek (2022)** investigated decision-making skills in individuals with mild intellectual disability (ID) and their relationship with intelligence and executive functioning. The primary aim of the study was to explore how intelligence and executive functioning influence decision-making in social situations among individuals with mild intellectual disabilities. The study involved a total of 160 students with mild intellectual disabilities, divided into two groups: an Experimental group and a control group. The researchers utilized the Wechsler Adult Intelligence Scale to assess intelligence and the Wisconsin Card Sorting Test (WCST) to evaluate executive functioning.

Contrary to expectations, the results of the study indicated that executive functioning was not significantly associated with decision-making. Furthermore, there was no observed interaction between the group (Experimental vs. control) and other variables.

The study highlighted the importance of verbal intellectual abilities, as well as abilities related to short-term memory and attention, in decision-making regarding social situations for individuals with mild intellectual disabilities. Additionally, the performance differences between individuals with ID and the control group were characterized as quantitative rather than qualitative.

Studies related to the Universal Design of Learning for children with mild intellectual disabilities

In this section, various studies examining the background knowledge of Universal Design

for Learning (UDL) and its influence on children with mild intellectual disabilities (MID) were reviewed. These studies delved into the significance of UDL in catering to the needs of children with MID.

The research aimed to elucidate how implementing UDL principles can positively impact the educational experiences of children with mild intellectual disabilities. By exploring the role of UDL in instructional design and delivery, these studies highlighted the potential benefits of creating inclusive learning environments that accommodate diverse learner needs, including those of children with Mild intellectual disabilities.

Hunt & Anderson (2011) investigated the implementation of Universal Design for Learning (UDL) principles in inclusive mathematics environments. The study illustrated how any lesson can be planned to provide learning experiences suitable for meeting diverse learning needs. An example was provided on how to approach a topic in middle school mathematics while incorporating essential UDL specifications using relevant technology.

In the study conducted by Katz & Sugden (2013), the Three-Block Model of Universal Design for Learning (UDL) was implemented in a high school setting. The role of the school leader, specifically the principal, in supporting educational reform was explored through a case study approach. The principal's efforts to provide professional development, planning time for collaboration, vision, and direct involvement in instructional delivery resulted in positive outcomes for both students' and teachers' learning, self-efficacy, and sense of community.

Lowrey et al. (2017) collected stories from general education teachers on the implementation of the Universal Design for Learning (UDL) framework and the inclusion of students with moderate to severe intellectual disabilities. Narrative inquiry was utilized to gather and analyze data, leading to the emergence of themes such as designing for learner variability, talking

about inclusion, teaming fosters success, and differing descriptions of UDL. Implications for research and practice were discussed.

Smit & Lowrey (2017) summarized current research on Universal Design for Learning (UDL) for students with intellectual disabilities (ID) and provided an action plan for researchers and practitioners to extend knowledge on implementing the UDL framework for individuals with intellectual disabilities.

Al Hazami & Ahmad (2018) conducted a study on Universal Design for Learning (UDL) to facilitate access to the general education curriculum for students with intellectual disabilities. These students often experience neurodevelopmental disorders that impede normal brain functioning, resulting in slower learning abilities and hindered development. Intellectual disabilities affect various aspects of mental and physical well-being, including comprehension, logical thinking, speech, memory, and problem-solving skills. Numerous research studies worldwide aim to develop innovative models and strategies to enhance access to general education for students with special needs. The UDL framework is designed to support intellectually disabled students by improving their cognitive abilities and adaptability, thereby increasing their access to general education.

Rogers-Shaw et al. (2018) explored the use of Universal Design for Learning (UDL) guidelines for accessible online instruction. The study discussed the history and philosophy of UDL and explained how UDL principles were used to improve an existing online course offering for adult learners.

Love et al. (2019) examined the application of universal learning design (UDL) to support the transition and inclusion of students with intellectual disabilities in postsecondary education. The study emphasized the importance of postsecondary education and discussed the establishment of college readiness for individuals with intellectual disabilities. It highlighted how UDL strategies could be applied to

instructional materials to promote inclusion in college-level courses and facilitate transition planning from secondary to postsecondary education.

James et al. (2020) addressed the challenge of measuring the implementation of Universal Design for Learning (UDL) in classrooms. They developed the UDL Observation Measurement Tool (UDL-OMT) to assess UDL implementation reliability. Results indicated strong internal consistency and the tool's ability to characterize differences in UDL implementation across various settings, suggesting its utility as a formative evaluation tool for practitioners.

King-sears & Johnson (2020) studied the implementation of Universal Design for Learning (UDL) in high school chemistry classes to support student achievement in learning, comparing students with and without learning disabilities. The study found that students in the UDL treatment scored significantly higher on post-tests than those in the comparison group, indicating the effectiveness of UDL instruction.

Edyburn & Dave (2021) discussed universal usability designs, behaviours, and tools reflecting the practice of Universal Design for Learning (UDL) in the classroom. Exemplars of platform tools, web-based curricula, and embedded supports were highlighted to assist students, educators, and parents in identifying UDL in practice.

James et al. (2021) examined the use of Universal Design for Learning (UDL) to support students with disabilities in scaling up physics courses. The study discussed the impact of professional development on executive function disorders and UDL for an introductory physics instructor and his students.

Park et al. (2021) investigated the use of a peer-delivered simultaneous prompting procedure to teach physical activities to students with mild to moderate intellectual disabilities. The study utilized a single-case multiple probes across participants design and demonstrated the effectiveness of the intervention in improving motor

performance. Maintenance of improved performance was observed even after the intervention ended, indicating its lasting impact.

Roski et al. (2021) investigated the effects of applying Universal Design for Learning (UDL) principles in inclusive science classes, particularly focusing on epistemic beliefs (EBs). The study did not support an outperformance of the extensive UDL environment, emphasizing the importance of carefully adopting and introducing UDL principles for learning in inclusive settings.

Yavuz et al. (2021) explored the effectiveness of using concept maps presented using augmented reality technology to teach basic features of animals to children with intellectual disabilities. The study utilized a single-subject research model and found that the concept maps using augmented reality technology were effective in teaching the basic features of animals to the participants. Social validity feedback from teachers of the participants was also positive.

Alhassan & Osei (2022) demonstrated the effectiveness of integrating drawing into English language instruction in classrooms for students with intellectual disabilities. Given the challenges these students face in language acquisition and learning, the study sought to explore specialized and effective instructional strategies. Employing a quasi-experimental design, the researchers conducted pre-tests and post-tests for both control and experimental groups. Results indicated that the experimental group, which received instruction integrating drawing, performed significantly better in the post-tests compared to the control group. This suggests that integrating drawing into English language teaching is an effective instructional approach for children with intellectual disabilities.

Ishartiwi et al. (2022) investigated strategies for teaching moral values to children with intellectual disabilities. The study aimed to impart moral values to students with intellectual disabilities, utilizing a questionnaire administered to their

teachers. Quantitative analysis categorized the data based on the grade levels of students with intellectual disabilities. The results revealed that teachers employed a variety of strategies to teach moral values. The researchers concluded that these strategies were characterized by concrete knowledge, with adjustments made according to the student's environment.

Kelly et al. (2022) proposed the application of Universal Design for Learning (UDL) principles to promote inclusion in outdoor learning in primary school settings. The article conceptualized outdoor learning and highlighted the benefits of applying UDL principles to outdoor learning to support diverse learners in the primary classroom.

Unal et al. (2022) aimed to enhance lesson planning with universal learning design (UDL). They compared lesson plans by teacher candidates before and after UDL training and found that post-training, teachers incorporated more differentiated options and varied strategies based on UDL principles. The study highlighted the importance of UDL training in improving teachers' understanding and implementation of UDL principles in lesson planning.

CONCLUSION

The review of related literature indicates a significant focus on Education and Special Education concerning students with special needs, particularly those with mild intellectual disabilities (MID). Numerous studies have explored various aspects of universal learning design (UDL), the nature of children with MID, and teaching strategies tailored to their needs. Children with MID often face challenges related to understanding, communication, and behaviour, leading to academic and social difficulties.

UDL, recognized as beneficial for all students, including those with intellectual disabilities, has been extensively studied. Researchers such as Edyburn Dave (2021), Scott et al. (2022), Roski et al. (2021), and Kelly et al. (2022) have explored UDL's role in fostering inclusion, particularly in outdoor

learning settings. Studies by Edyburn (2021), Garcia et al. (2020), Chen & Dote-Kwan (2021), and Rogers-Shaw et al. (2018) have examined educational inclusion through UDL, offering alternative teaching training programs and strategies. Additionally, James et al. (2021), Lewis (2018), and Russo (2019) have delved into UDL's application in teaching, focusing on content representation, learner engagement, and learning expression. Research has demonstrated the importance of UDL in supporting access to the general education curriculum for students with intellectual disabilities, as highlighted by Love et al. (2019), Ishartiwi et al. (2022), Flanagan & Morgan (2021), Laura (2022), Al Hazami & Ahmad (2018), Smit & Lowrey (2017), and Yavuz et al. (2021). However, a critical evaluation reveals that research often treats UDL as a separate variable rather than exploring its sources and experiences among teachers, workers, parents, and students. Few studies specifically focus on UDL for children with MID.

In conclusion, while UDL is recognized as an important and effective teaching approach for children with mild intellectual disabilities, further research is needed to explore its effectiveness through experimentation. This will contribute to the development of evidence-based intervention strategies tailored to the needs of children with MID.

Declaration by Authors

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