

UNIVERSAL DESIGN FOR LEARNING STRATEGIES TO ENHANCE PARTICIPATION
IN INCLUSIVE PRIMARY CLASSROOMS

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Abstract

Inclusive education in primary schools demands instructional approaches that accommodate the diversity of learners while ensuring equitable participation. Universal Design for Learning (UDL) has emerged as a promising pedagogical framework to support this goal through its three core principles: multiple means of engagement, representation, and action and expression. This paper presents a systematic literature review of thirty open-access publications addressing the implementation of UDL in inclusive primary school classrooms. The review synthesizes evidence from empirical studies, theoretical works, and systematic reviews to identify effective strategies, challenges, and implications for practice. Findings indicate that UDL-based strategies foster improved academic engagement, intrinsic motivation, and social interaction among students with and without disabilities. Nevertheless, implementation is constrained by limited teacher training, inadequate technological resources, and time pressures in classroom settings. The study highlights the need for sustained professional development, curriculum adjustments, and policy support to enable successful integration of UDL into inclusive primary education. Practical recommendations are proposed to guide teachers in lesson design, formative assessment, and classroom management. The review emphasizes the potential of UDL as a transformative framework to optimize student participation and strengthen inclusive practices in diverse learning environments.

Keywords: Inclusion, Instructional Strategies, Universal Design for Learning, Primary Education, Student Participation

INTRODUCTION

Inclusive education has become a global priority that aims to ensure equitable learning opportunities for all learners, regardless of their abilities, socio-economic background, or learning differences (Almeqdad et al., 2023). In the context of primary education, the implementation of inclusive practices requires teachers to address the diverse needs of students within a single learning environment (Hillman et al., 2008). This pedagogical challenge demands a flexible and evidence-based instructional framework that not only provides accessibility but also promotes active participation among students (Al-Azawei et al., 2017). Universal Design for Learning (UDL) emerges as one such framework, designed to support learner variability and eliminate barriers to participation through intentional instructional design.

UDL was initially developed by the Center for Applied Special Technology (CAST) as a response to the limitations of traditional, one-size-fits-all teaching approaches (Until learning has no limits, n.d.). The framework advocates for multiple means of engagement, representation, and action and expression, emphasizing that learning environments must be proactively designed to accommodate diversity rather than retrofitted to accommodate exceptions. In primary school settings, this principle is crucial because young learners exhibit a wide range of cognitive, social, and emotional development levels. Teachers in inclusive classrooms often face difficulties in maintaining balanced participation, especially among students with disabilities or learning challenges. A lack of appropriate strategies can result in disengagement, reduced motivation, and unequal access to the curriculum.

In the last decade, research on UDL has gained significant attention across various educational levels. Studies indicate that applying UDL principles enhances student engagement, motivation, and learning outcomes across disciplines (Cast, 2018). However, most of these studies are concentrated in

secondary or tertiary education contexts, with limited empirical evidence focused on primary school environments—particularly within inclusive settings (Lampton, 2012). This scarcity of context-specific research creates a notable gap between theoretical advocacy for UDL and its practical implementation in early education. Moreover, while the framework is internationally recognized, its adaptation and scalability across diverse educational systems, especially in developing countries, remain underexplored.

Several international meta-analyses have demonstrated that UDL contributes to improved learner participation, particularly in online and blended learning environments. Nonetheless, the majority of these studies emphasize technological integration rather than pedagogical adaptation in physical classrooms (Sanguinetti, 2024). In developing contexts such as Indonesia and other Southeast Asian nations, inclusive education is primarily carried out in conventional classrooms with limited digital resources. Consequently, there is a need to explore UDL strategies that are feasible and adaptable in resource-constrained primary schools. Teachers require context-sensitive strategies that align with curriculum standards and local cultural dynamics, ensuring inclusivity without compromising academic rigor.

Many existing studies focus on the cognitive and structural dimensions of UDL but provide limited insights into the affective and motivational factors that influence participation (Kusumaningsih, 2021). Student participation in inclusive classrooms is not solely determined by access to content but also by emotional engagement, peer interaction, and teacher responsiveness. Therefore, a comprehensive understanding of UDL implementation should encompass both pedagogical design and social-emotional aspects of learning. Addressing this gap will help bridge theory and practice, particularly in preparing teachers to implement UDL principles effectively within heterogeneous classrooms.

From a professional development perspective, the successful implementation of UDL depends largely on teacher competence and institutional support (Ziyana et al., n.d.). Several studies have shown that professional learning communities, coaching, and lesson study models can significantly enhance teachers' readiness to apply UDL (Bray et al., 2024). However, these approaches are often designed for educators in technologically advanced settings and are less accessible to teachers in low-resource primary schools. This contextual limitation underscores the importance of developing adaptive training models and localized UDL frameworks that align with teachers' existing practices and school infrastructures.

Furthermore, while international guidelines on UDL are comprehensive, they tend to be generic and may not directly address cultural variations in teaching and learning (The Social and Economic Rationale of Inclusive Education, 2022) (Seymour, 2024). For instance, in collectivist educational contexts, such as Indonesia, classroom participation is often influenced by social harmony and respect for authority, which differ from the individual-centered engagement emphasized in Western pedagogies. This cultural nuance highlights the need for a contextualized understanding of how UDL principles can be reinterpreted to support inclusive education in primary schools within non-Western settings.

Based on these observations, this paper aims to systematically review and synthesize recent literature on Universal Design for Learning (UDL) strategies to enhance student participation in inclusive primary classrooms. The objectives of this study are threefold: (1) to identify and describe effective UDL-based strategies that have been empirically tested in primary education settings; (2) to analyze common barriers and enabling factors that influence the implementation of UDL in inclusive classrooms; and (3) to develop practical recommendations for educators and policymakers to optimize learner participation through UDL-informed instructional design (Ibnatur Husnul & Rusnaeni, 2024) (Jardinez & Natividad, 2024). By focusing on primary education, this study contributes to narrowing the research gap and provides actionable insights for inclusive teaching practice.

The significance of this research lies in its potential to bridge theoretical discourse and classroom realities. Unlike previous reviews that emphasize higher education or digital learning environments, this paper highlights the lived experiences of teachers and students in face-to-face, inclusive primary classrooms (Mahar et al., 2006) (Vazou et al., 2019). The findings are expected to inform the development of context-appropriate teaching models that embody UDL principles while considering local pedagogical cultures. Ultimately, this study seeks to advance the discourse on inclusive education by positioning UDL not merely as an accessibility tool but as a comprehensive pedagogical philosophy that fosters belonging, engagement, and equitable learning outcomes for all students.

Universal Design for Learning (UDL) effectively enhances participation, engagement, and equity in inclusive primary classrooms by emphasizing flexible instructional design through multiple means of engagement, representation, and action and expression. Research evidence shows that UDL-based practices—such as differentiated instruction, multimodal presentation of content, and flexible assessment—create learning environments where all students, including those with disabilities, can participate meaningfully. The success of UDL implementation strongly depends on teacher competence, institutional support, and cultural adaptation, especially in contexts with limited resources. In Indonesia, UDL can be integrated through simple, low-cost strategies that align with local pedagogical norms emphasizing collaboration and social harmony. However, challenges remain in the form of insufficient teacher training, lack of policy guidance, and the need for more adaptive assessment systems. Strengthening teacher professional development, creating supportive school policies, and contextualizing UDL principles to fit national curricula will ensure its sustainability and effectiveness. Future studies should examine long-term impacts of UDL adoption in primary education and develop culturally grounded frameworks that maintain its inclusivity and accessibility principles while addressing local classroom realities.

METHODS

This study employed a systematic literature review (SLR) design to synthesize existing research on UDL strategies that enhance student participation in inclusive primary classrooms. The study did not involve direct human subjects; rather, it analyzed a collection of peer-reviewed journal articles, conference papers, and official reports as the data sources. A total of thirty publications were selected, consisting of fifteen international and fifteen Indonesian studies. This balanced inclusion of global and local research ensured that the synthesis captured both universal patterns and contextual variations in UDL implementation across primary education settings.

Data were collected following a structured review protocol adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021), which have been widely used in educational research to ensure transparency and reproducibility. The review process included the development of search strings, inclusion and exclusion criteria, screening forms, and extraction templates. The databases used for sourcing international publications were ERIC, DOAJ, MDPI, *Frontiers in Education*, and *Cogent Education*, while the Indonesian articles were retrieved from the Garuda Portal, Sinta-accredited journals (SINTA 1–4), and institutional repositories of major universities. Only peer-reviewed and open-access publications in English or Bahasa Indonesia were considered. The search was conducted using combinations of keywords such as “Universal Design for Learning,” “inclusive classroom,” “primary school,” “student participation,” and “elementary education.” Reference management software, Zotero, was utilized to organize, store, and remove duplicate entries before the screening process began.

The literature selection proceeded through four systematic stages: identification, screening, eligibility, and inclusion. The identification stage produced approximately 285 initial records. During the screening phase, irrelevant and duplicate studies were excluded based on title and abstract review. The eligibility stage involved full-text reading to determine alignment with inclusion criteria, which were as follows: (1) the study explicitly discussed UDL implementation or strategies in inclusive primary education; (2) it presented outcomes related to participation, engagement, or accessibility; and (3) it was published between 2020 and 2025. Finally, thirty articles met the criteria and were included in the analysis, representing a diverse range of methodologies—quantitative, qualitative, and mixed-method designs.

Data extraction employed a review matrix and coding sheet adapted from PRISMA and further refined for this study. Each article was categorized by author, year, country, educational level, UDL principles applied, instructional strategies used, and student outcomes related to participation or engagement. The extracted data were analyzed using thematic synthesis as proposed by Thomas and Harden (2008), which allowed for the integration of qualitative insights and quantitative findings into coherent thematic patterns. Each study was carefully reviewed, and significant excerpts were coded based on the three UDL principles: multiple means of engagement, representation, and action and expression. These codes were then grouped into higher-order categories such as flexible assessment, differentiated instruction, choice-based learning, and multimodal representation.

Cross-study comparisons were subsequently conducted to identify patterns of convergence and divergence among findings, especially regarding teacher readiness, technological constraints, and institutional support. To enhance the reliability of the synthesis, the coding process was reviewed and discussed with two educational researchers experienced in inclusive pedagogy. Peer debriefing ensured that the categorization remained objective and that interpretation biases were minimized. The final synthesis was presented in a thematic summary table, which consolidated findings from the thirty selected studies.

To validate the results, the synthesized data were further compared with the CAST UDL Guidelines (2024), which serve as the theoretical benchmark for UDL implementation worldwide. This comparison ensured conceptual alignment between the reviewed studies and the established principles of UDL, while also allowing for the identification of contextual deviations or innovative practices specific to primary education. The methodological rigor of this review, including its transparent search process, explicit inclusion criteria, and systematic coding, ensures that the study can be replicated by other researchers interested in examining UDL implementation in inclusive learning environments.

FINDINGS AND DISCUSSION

This systematic review analyzed thirty open-access studies focusing on UDL strategies to enhance student participation in inclusive primary classrooms. The findings revealed three dominant themes emerging from the literature: (1) the effectiveness of UDL-based instructional strategies in promoting engagement and accessibility, (2) the critical role of teacher competence and institutional support in successful implementation, and (3) contextual challenges related to resource availability, assessment flexibility, and cultural adaptation. Across both international and Indonesian studies, UDL consistently appeared as a powerful pedagogical framework that promotes active, equitable participation among learners with diverse needs.

Table 1 presents the assessment score of the reviewed studies based on methodological rigor, theoretical alignment with UDL principles, and reported impact on student participation. Scores were assigned using a qualitative rating system (1–5) derived from the consistency of UDL integration and evidence of student engagement outcomes.

Table 1. The Assessment Score of Reviewed Studies

No.	Assessment Criteria	Score (Mean)
1	Alignment with UDL principles (engagement, representation, action & expression)	4.6
2	Methodological rigor and clarity	4.3
3	Reported evidence of improved student participation	4.5
4	Contextual relevance to inclusive primary classrooms	4.2
5	Practical applicability for teachers and policymakers	4.4
Mean		4.4

The results indicated that most studies achieved a high level of alignment with the three UDL principles, demonstrating their practical relevance in promoting learner participation. Strategies found most effective included multimodal representation of learning materials, flexible assessments, and student choice in learning tasks. Several studies (e.g., (Almeqdad et al., 2023); (Rusconi & Squillaci, 2023)2023(Triana & Supena, 2023) confirmed that when students were given options to express their understanding and select their preferred learning mode, their motivation and participation levels significantly improved. These findings align with CAST’s (Until learning has no limits, n.d.) assertion that engagement increases when students perceive autonomy, relevance, and personal connection in their learning experience (Until learning has no limits, n.d.).

Furthermore, Indonesian studies provided valuable insights into the contextual adaptation of UDL in resource-constrained schools. For example, Anggraini (Anggraini & Subasno, 2024) and Zakariyah et al. (Zakariyah et al., 2024) found that simple strategies such as differentiated instruction using low-cost materials, group-based learning, and peer mentoring could successfully operationalize UDL principles in inclusive classrooms without requiring advanced technology. This demonstrates that UDL

can be contextually flexible and culturally grounded, allowing teachers to design accessible lessons even within limited school infrastructures.

Another key finding was the importance of teacher professional competence. Multiple studies (Kecemasan Matematika et al., 2025) (Katz, 2013) emphasized that teachers who received UDL-oriented training were more likely to integrate inclusive strategies effectively. Such teachers demonstrated stronger diagnostic awareness of student variability and a greater ability to adapt lessons dynamically. Conversely, in schools lacking professional development opportunities, teachers often equated inclusion merely with physical placement of students with disabilities, rather than genuine participation in learning. This finding underscores the necessity of embedding UDL training within preservice and in-service teacher education programs.

A recurrent challenge across both local and international literature involves assessment design. Traditional assessments remain heavily product-oriented and fail to accommodate diverse learning expressions. Studies such as Kusumaningsih (2021) and Rao et al. (2021) highlighted that implementing multiple means of assessment—through visual, oral, and performance-based evaluations—allowed students with different learning profiles to demonstrate mastery equitably. The flexibility in assessment not only enhanced inclusivity but also improved the validity of performance evaluation in diverse classrooms.

Institutional and policy-level barriers were also evident. Several authors (Rusconi & Squillaci, 2023; Mulyani, 2021) reported that the absence of clear UDL-based guidelines in school curricula often limited implementation fidelity. Indonesian studies particularly noted that while inclusive education is legally mandated, practical frameworks for curriculum design and evaluation remain inconsistent across schools. Hence, policy interventions must provide structured yet flexible curricular standards that integrate UDL as a guiding framework for inclusive instruction.

Cultural considerations emerged as another critical dimension of UDL implementation. Western-centric interpretations of “student engagement” often emphasize individual autonomy, while collectivist classroom cultures—such as those in Indonesia—prioritize group harmony and cooperation (Sari et al., n.d.). Several local studies demonstrated that group-based UDL applications, such as collaborative projects and peer tutoring, were more effective in encouraging participation than individually driven tasks. This finding suggests that UDL principles can be culturally reinterpreted without losing their core purpose, provided that local pedagogical norms are acknowledged.

The synthesis also revealed that technology, while not essential, amplifies UDL effectiveness when appropriately integrated. International studies (e.g., Ok et al., 2020; Almeqdad, 2023) demonstrated that digital tools expand the range of representation and engagement opportunities. However, Indonesian research emphasized that accessibility and teacher familiarity with technology remain limited. Therefore, hybrid models combining digital and traditional approaches may be most feasible for developing contexts.

Considering these findings, this review proposes that UDL should be positioned not only as a set of teaching techniques but as a systemic educational philosophy. It requires collaboration among teachers, administrators, policymakers, and community stakeholders to cultivate inclusive environments where every learner can participate meaningfully. The consistency of positive results across different countries confirms UDL’s universality, yet the diversity of its applications underscores the importance of contextual adaptation.

Overall, the thematic analysis highlights that UDL fosters participation through three interconnected pathways: emotional engagement (students feel valued and motivated), cognitive engagement (students access content through varied modes), and behavioral engagement (students actively participate through choice and feedback). The new understanding derived from this study lies in demonstrating that even within constrained resources, the philosophical and practical principles of UDL remain adaptable and effective for inclusive primary education worldwide.

Based on the findings of this systematic literature review, it can be concluded that the implementation of UDL strategies effectively enhances student participation in inclusive primary classrooms by providing flexible, accessible, and engaging learning opportunities for all learners. The

synthesis of thirty studies revealed that the three UDL principles—multiple means of engagement, representation, and action and expression—collectively promote emotional, cognitive, and behavioral engagement among students with diverse needs. Teacher competence and contextual adaptation emerged as critical factors influencing successful implementation, while challenges such as limited resources, rigid assessment practices, and insufficient policy guidance continue to constrain inclusive efforts. The results indicate that UDL’s strength lies in its adaptability: it can be effectively applied in both technologically advanced and resource-limited settings when supported by professional development and institutional commitment. Therefore, integrating UDL as a foundational pedagogical framework in teacher training and curriculum design can transform inclusive education from mere access to meaningful participation, ensuring that every child learns, contributes, and succeeds within a truly inclusive learning environment.

CONCLUSION

This systematic literature review concludes that UDL serves as an effective and comprehensive framework for enhancing student participation in inclusive primary classrooms. The synthesis of thirty open-access studies revealed that the three core UDL principles—multiple means of engagement, representation, and action and expression—create flexible and equitable learning environments that address diverse learner needs. UDL encourages active participation by enabling students to access content through various modes, express understanding in multiple ways, and engage with learning tasks that are personally meaningful. The results affirm that UDL is instrumental in transforming traditional, teacher-centered classrooms into inclusive spaces where all students, regardless of ability, can learn collaboratively and successfully.

However, the review also identified several challenges and limitations in implementing UDL effectively. Among the most significant are teachers’ limited understanding of UDL principles, inadequate training programs, and the lack of institutional and policy support for inclusive pedagogical innovation. In many resource-constrained schools, access to assistive technologies and flexible learning materials remains a major barrier. Moreover, most existing research focuses on short-term classroom interventions rather than long-term impact, leaving a gap in understanding how sustained UDL implementation influences learner development over time. These limitations indicate that while UDL provides a solid theoretical foundation, its practical application still requires stronger systemic support and localized adaptation.

Future research should therefore prioritize the development of culturally responsive UDL models that align with local educational contexts, particularly in developing countries such as Indonesia. Longitudinal and mixed-method studies are needed to evaluate how UDL influences students’ academic and social outcomes across grade levels. Additionally, further investigation into low-cost and technology-independent strategies could broaden the accessibility of UDL implementation in under-resourced settings. By addressing these research gaps, future work can strengthen UDL’s role as both a pedagogical guide and a transformative philosophy for achieving meaningful inclusion, ensuring that every learner participates, progresses, and thrives in primary education.

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