



Implementation of Universal Design for Learning to Support Emotional Regulation and Social Skills among Students with Attention Deficit Hyperactivity Disorder (ADHD) and Slow Learning Profiles in Inclusive Elementary Schools

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Abstract: This study aims to describe the implementation of Universal Design for Learning (UDL) to support emotional regulation and social skills among students with ADHD and slow-learner profiles at UPT SD Negeri 20 Gresik, an inclusive elementary school without a special education teacher (GPK). The study addresses the need for effective inclusive education strategies in resource-constrained settings. A qualitative approach with an explanatory case study design was employed, involving four students—two with ADHD and two with slow-learner profiles from Grades III and IV—as well as classroom teachers, the school principal, and parents as informants. Data were collected over three months through participatory observations, in-depth interviews, document analysis, and visual analysis and were analyzed using the interactive model of qualitative data analysis. The findings indicate that classroom teachers had organically implemented all three UDL principles despite having received no formal UDL training. Multiple Means of Engagement was implemented through visual media and hands-on demonstrations; Multiple Means of Engagement was supported through daily emotional check-ins and a designated comfort zone; and Multiple Means of Action and Expression was facilitated by allowing students to choose how to demonstrate their responses. These practices were associated with a reduced frequency of emotional outbursts among students with ADHD and more consistent development of social skills among students with slow-learner profiles. The findings provide empirical evidence that consistent implementation of UDL by regular classroom teachers can provide meaningful psychosocial support for students with diverse learning needs, including in schools without specialized teacher support. The study recommends that regular classroom teachers receive structured UDL training as a strategic step toward promoting meaningful, rather than merely administrative, inclusion.

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Introduction

Inclusive education in Indonesia has shown significant development after the enactment of Permendiknas Number 70 of 2009, which requires public schools to accept students with special needs (SBK) in one educational environment. This policy was later replaced by the Regulation of the Minister of Education, Culture, Research, and Technology Number 48 of 2023, which clearly integrates the principles of individualized educational services for SBK into the structure of the Independent Curriculum. However, in its implementation, there are still various structural challenges that need to be faced, especially in schools that do not have Special Assistant Teachers (GPK) as the main supporting party for inclusive services (Helmawati et al., 2025)



One category of students with special needs that is often found in inclusive elementary schools are children with ADHD as well as those who have learning delays. Children with ADHD generally face challenges in controlling impulses, maintaining concentration, and regulating emotions, which directly affects the way they interact socially in the classroom (Kessling et al., 2026). Meanwhile, students who experience learning delays are recognized through below-average information processing speeds and often have difficulty honing social skills due to their slowness in understanding the context of social relationships (Hermawan & Suparmi, 2025). Although these two groups have different psychosocial characteristics, they are also at risk of experiencing social isolation in a common classroom environment.

Empirical research shows that most inclusion interventions at the primary school level focus more on academic achievement, while attention to social-emotional aspects is unbalanced (Devi & Suarni, 2024). In addition, most of the existing studies were generally conducted in schools with the full support of GPK, so there is a glaring lack of knowledge about effective strategies for inclusive learning in contexts without GPK (Saskia, et al., 2025). Research by Salamah et al. (2025) found that teachers in regular classes have difficulty adjusting learning methods that can meet the diverse needs of students at the same time, especially in terms of social-emotional.

Universal Design for Learning (UDL) emerged as a suitable framework to address this challenge. Grounded in the foundational work of Rose and Meyer (2002) and formally codified by the Center for Applied Special Technology (CAST, 2018), UDL is organized around three core principles: (1) Multiple Means of Representation providing information in varied formats; (2) Multiple Means of Engagement offering differentiated approaches to motivate and sustain learning; and (3) Multiple Means of Action and Expression allowing students to demonstrate knowledge through diverse channels (Haris et al., 2025). These principles allow educators to create learning environments that are adaptable and sensitive to the diverse needs of students without requiring separate modifications for each individual (Qomariah et al., 2025). A number of international studies have revealed the effectiveness of UDL in supporting SBK's social-emotional skills, but its application in inclusive primary school environments in Indonesia is still very minimal (Medina Vásquez et al., 2025).

Based on the shortcomings in the study, the objectives of this study are: (1) to explain how classroom teachers at UPT SD Negeri 20 Gresik implement UDL as an inclusive school that does not have GPK; (2) assess the impact of the application of UDL on the emotional regulation of students with ADHD and those who have learning difficulties; and (3) researching the role of UDL in improving social skills in both categories of students. It is hoped that this research can develop a practical model that can be used by regular classroom teachers to manage students' psychosocial diversity within the framework of the Independent Curriculum (Susilowati et al., 2025).

Research Method

This study uses a qualitative method with an explanatory case study design. The selection of this design was based on the need not only to describe the phenomenon of UDL implementation, but also to explain the underlying mechanisms through which pedagogical strategies implemented by teachers influence students' emotional and social experiences (Nuraeni et al., 2023). The explanatory design of a case study is seen as appropriate because the researcher seeks to answer the question around the "how" and "why" of a pedagogical action having a certain effect on a complex subject (Mujtahidin & Oktariato, 2022). The



location of this research is at UPT SD Negeri 20 Gresik, East Java, which is an inclusion school but does not have permanent GPK personnel.

The determination of the research subject was carried out by purposive sampling technique based on the following criteria: (a) students who have undergone a psychological evaluation that indicates the presence of ADHD or slow learner characteristics; (b) registered as an active student in grade III or IV; and (c) have participated in the learning process for a minimum of one semester (Bahri, 2022) Four students were selected to be the main subjects, and their profiles are presented in Table 1.

Table 1. Research Subject Profile

Subject Code	Category	Classes	Key Characteristics
S1	ADHD	IV	Impulsive, difficult to focus, emotionally reactive
S2	ADHD	III	Hyperactive, often inappropriate interaction
S3	Slow Learner	IV	Slow, socially passive processing
S4	Slow Learner	III	Limited social response, communication barriers

In addition to the four students mentioned, the study also involved additional informants (Himam et al., 2026) consisting of two teachers for grades III and IV, the principal, as well as two parents of the students who had given written permission before the study began. This study adhered to established ethical principles for research involving child participants. Written informed consent was obtained from the parents or legal guardians of all four research subjects and the school principal prior to data collection. Child assent was also sought from each student participant in an age-appropriate manner. To protect participant confidentiality, all identifying information was anonymized: students are referred to as S1–S4 and teachers as T1–T2 throughout this report. Information retrieval is carried out by applying four mutually supportive methods, as described in Table 2. The triangulation process is carried out methodologically by comparing techniques and also triangulating sources through comparisons between sources to ensure the reliability of the data collected.

Table 2. Data Collection Techniques and Instruments

Technique	Instruments	Data Source
Participatory observation	Structured observation sheet	Classroom teachers, students
In-depth interviews	Semi-structured interview guidelines	Teachers, principals, parents
Documentation studies	List of documents	RPP, report card, teacher notes, videos
Visual analysis	Photo/video recordings of classroom activities	Inclusion classes, learning corners



Visual data in the form of videos of classroom activities and photographs documenting the learning process were analyzed separately using a visual analysis approach. This approach allows researchers to recognize nonverbal behavior patterns, postures, facial expressions, and spatial interaction dynamics that cannot be explained by simply translating speech.

The data analysis process follows an interactive model developed by Miles, Huberman, and Saldaña, as used in the research of Irfan and Usman (2023). This model consists of three parts: (a) data condensation, which is the process of selecting, focusing, and simplifying raw data; (b) presentation of data in the form of descriptive matrices, subject comparison tables, and verbal narratives; and (c) conclusion making and verification by comparing the results of the research with the UDL theory and related literature. The validity of the data was checked by team members with classroom teachers and continued with observation for three months (Husnullail et al., 2024). Behavioral frequencies reported in the findings (e.g., frequency of emotional outbursts, frequency of social interaction initiation) represent counts derived from systematic tallying of behavioral events recorded in structured observation protocols across all sessions during the three-month period. These counts are presented as weekly averages; broader patterns of change are described through qualitative narrative corroborated by teacher interview accounts and visual data.

Results and Discussion

Form of UDL implementation at UPT SD Negeri 20 Gresik

Observations over three months showed that teachers at UPT SD Negeri 20 Gresik have naturally adopted several teaching methods consistent with UDL principles, even though they had never previously participated in formal training on UDL. This is evident in several concrete ways. First, in accordance with the principle of Multiple Means of Representation, teachers use a combination of picture boards, word cards with illustrations, and hands-on demonstrations in the learning process (Cheung et al., 2025).

Each oral explanation is accompanied by a visual display placed at the front of the classroom. In addition, in accordance with the principle of Multiple Means of Engagement, the teacher routinely conducts daily emotional check-ins at the beginning of class using colorful mood cards. This helps students recognize and express their feelings before beginning learning activities (Kuhuwael & Nara, 2024). Third, in line with the principle of Multiple Means of Action and Expression, students are given the freedom to complete assignments in the manner of their choice, such as speaking, writing by hand, or drawing, according to their individual abilities (Yulaichah et al., 2024).

Visual data from classroom recordings show that the presence of a comfort zone in the form of a classroom corner with a mat and sensory aids has a positive impact on reducing the frequency of behaviors that indicate difficulty adjusting in students with ADHD, as noted by Nurista et al. in 2025. The third-grade teacher noted that, after the process had been underway for four weeks, the S1 students would independently retreat to their comfort zones when they sensed an increase in tension, without needing to be instructed to do so.

The Impact of UDL on Emotion Regulation and Social Skills

Analysis based on observation, interview, and documentation data showed that there were recognizable changes in the four subjects. The findings are presented in full in Table 3.



Table 3. Development of Subjects' Emotional Regulation and Social Skills

Subject	UDL Principles Applied	Development of Emotion Regulation	Social Skills Development
S1 (ADHD)	Multimodal representation, Visual timer, Comfort zone	The frequency of emotional outbursts decreased from 7x/week to 2x/week	Start queuing and sharing stationery with friends
S2 (ADHD)	Visual task cards, Positive reinforcement, Emotional check-in	Able to identify one's emotions through expression cards	Actively participate in small group work of 2–3 people
S3 (Slow Learner)	Stepwise instruction, structured peer tutoring	Reduced anxious reaction when answering incorrectly in front of the class	Dare to ask peers questions in a structured context
S4 (Slow Learner)	Social scaffolding, Concrete visual media	Expression of emotions is more open, no longer completely silent when difficult	Initiating greetings and simple conversations with friends

Qualitative data from in-depth interviews with grade IV teachers showed that changes in S2 subjects did not occur directly and continuously, but occurred in a variety of different stages during the first four weeks before finally reaching a stable state. The teacher said: "At first S2 was often angry, but after the emotion check card was used regularly, he started telling the reason why he was angry, rather than acting immediately." This statement shows that UDL is not a quick way to solve a problem, but rather a slow process of forming a habit of regulating emotions.

In students who study slowly (S3 and S4), the development of social skills occurs more slowly but more regularly. Data recorded in the teacher's diary showed that the frequency of initiation of social interaction by S4 increased from an average of 0.3 times per day in the first week to 2.1 times per day at the end of the third month. Visual evidence from classroom recordings suggests that S4 began to maintain eye contact while speaking in brief conversations, which is a sign of the development of nonverbal communication abilities that are not visible from ordinary observation.

Placement of UDL Principles on Psychosocial Achievement

By analyzing various subjects and data collection methods, the researchers described the relationship between each principle of UDL and the psychosocial impacts that have been found, as shown in Table 4.



Table 4. Mapping of UDL Principles to Psychosocial Achievement

Principle UDL (CAST)	Classroom Implementation	Impact on Emotional & Social Regulation
Multiple Means of Representation	Materials are presented through visual, audio, and manipulation of concrete objects	Lowers anxiety, improves understanding of social context
Multiple Means of Engagement	Daily emotional check-in, comfort zone, individual positive reinforcement	Increase motivation, reduce impulsive emotional reactivity
Multiple Means of Action & Expression	Response options (oral/written/pictured), task cards, peer tutoring	Increase confidence and initiate social interaction

Discussion

UDL as a framework for Contextual Emotion Regulation.

This study demonstrates that UDL, when implemented consistently, extends beyond facilitating academic access to function as a meaningful framework for psychosocial support. The decrease in emotional outbursts in students with ADHD supports Frolli et al. (2023), who established that structured visual learning environments significantly reduce the cognitive and emotional burden experienced by children with ADHD. This outcome is explicable through executive dysfunction theory: children with ADHD characteristically experience deficits in working memory, inhibitory control, and emotional self-regulation due to atypical development of the prefrontal cortex and its connections to subcortical regulatory structures (Wegmann et al., 2026). The comfort zone and visual timer in this study function as external environmental scaffolds compensating for these internal regulatory deficits: the comfort zone supports physiological de-arousal, while the visual timer externalizes temporal demands that are intrinsically impaired in ADHD. Together, these UDL-aligned supports extend students' regulatory capacity beyond their neurological baseline consistent with the antecedent-based regulation model of Vetter et al. (2024).

The application of daily emotional check-ins reflects the Multiple Means of Engagement principle of UDL, which emphasizes the importance of improving self-regulation skills as a very important part of the learning process. This practice is in line with the results of Anggraini and her team's 2024 research that shows that social and emotional activities integrated into the inclusion classroom system are not only additional activities outside of class hours, but have a more lasting impact on the self-regulating abilities of students with ADHD.

UDL and Slow Learner Social Skills

The process of developing social skills in the slow-learning subjects in this research showed a qualitatively different pattern compared to the group of children with ADHD. Individuals who fall into the learner category slowly need more organized social support and more time to understand and accept the material. Although the process of change is slower, the results achieved tend to be more stable and consistent. This is in accordance with the characteristics of slow learners described by Fajar Setyorini et al. (2025). A slower learning process does not mean that they are incapable, but it does indicate that they need more time and a more organized way.



The peer tutoring strategy neatly prepared by teachers for S3 subjects is a way of applying the principle of expression and dual action from UDL in social situations (Ringo et al., 2025). Ayuningtyas and his team's 2026 research shows that the type of interaction planned with peers, rather than spontaneous interactions without assistance, is the most effective method to help students who learn later improve their communication and cooperation skills. These findings reinforce the belief that the UDL approach not only has an impact in the academic field, but also indirectly creates a better social environment in the classroom, therefore supporting the development of social skills for all students.

Implications of the absence of GPK

One of the most important results of this research is the consistent use of the UDL approach by regular classroom teachers is able to meet most of the assistance needs that are typically handled by the accompanying teacher. This does not mean that GPK is not important; in fact the absence of GPK remains a structural challenge that must be overcome through policy. However, in situations where resources are limited, UDL provides a single framework that allows teachers to build a learning environment that can adapt to a wide range of student needs simultaneously (Ummah & Rahman, 2024). This result has a major impact on policies within the framework of the Independent Curriculum and Regulation of the Minister of Education, Culture, Research, and Technology Number 48 of 2023. This policy emphasizes differentiation in learning as a key strategy, which has considerable conceptual similarities with the principles of UDL. Therefore, teacher training on the principles of UDL can be a strategic step that also helps in implementing the Independent Curriculum and providing good inclusive education services, even in schools that lack GPK personnel (Pranyoto & Berangka, 2025).

Conclusion

This study yielded three main findings. First, the implementation of UDL at UPT SD Negeri 20 Gresik took three concrete forms corresponding to the three UDL principles of Rose and Meyer (2002) and CAST (2018): Multiple Means of Representation through multimodal instructional materials, Multiple Means of Engagement through daily emotional check-ins and comfort zone provision, and Multiple Means of Action and Expression through flexible assignment formats and structured peer tutoring. This implementation is carried out instinctively by regular classroom teachers without formal training on UDL, which shows the potential for further expansion if supported by planned training.

Second, the implementation of UDL has been proven to strengthen the ability to regulate emotions in students with ADHD by modifying the environment to reduce triggers of emotional reactivity, as well as building habits of recognizing and expressing emotions that are carried out regularly and in a structured manner. Third, UDL supports social development for students who have difficulty learning through organized social support and assisted interactions, allowing them to slowly develop social initiative abilities in a safe and predictable environment. Overall, this research confirms that UDL is a relevant framework not only for academic accessibility but also serves as an efficient psychosocial empowerment tool in the context of inclusive education in Indonesia. The implementation of UDL in teacher training and inclusion school policies, especially in institutions that do not yet have GPK, is proposed as a strategic step to achieve meaningful inclusion, not just administrative inclusion.



Recommendation

Based on the research findings, the following recommendations are organized across three areas. For Classroom Teachers and Schools: Implement the three UDL principles (Multiple Means of Representation, Engagement, and Action & Expression) intentionally; establish daily emotional check-in routines and comfort zones as standard inclusive classroom features regardless of GPK availability; maintain behavioral observation journals for evidence-based reflection. For Educational Authorities and Policy Makers: Mandate structured UDL professional development for all inclusive school teachers, prioritizing schools without GPK; formally recognize teachers' psychosocial support roles in policy; allocate dedicated budget for inclusive classroom infrastructure. For Future Researchers: Conduct larger-scale mixed-methods studies to quantify UDL behavioral outcomes across multiple schools; investigate long-term maintenance of psychosocial gains beyond three months; examine the impact of formal UDL training versus organic implementation as documented here.

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