

Teachers' Implementation of Universal Design for Learning in Inclusive Classrooms: A Systematic Literature Review.

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ABSTRACT - This study examines how the Universal Design for Learning (UDL) Model helps the implementation of teachers' teaching in inclusive classes through the Systematic Literature Review (SLR) approach. UDL is a flexible pedagogical framework that emphasizes the three main principles of engagement, representation, and action and expression to ensure that every student has the same access to learning despite their different abilities. This study was conducted using the PRISMA approach to identify, analyse and synthesize empirical evidence from articles obtained through three main databases: Scopus, ERIC and SciSpace. A total of 55 articles were identified, but after the screening and eligibility evaluation process, only 10 articles met the inclusion criteria and were analysed in depth. The findings of the study show that UDL is able to improve the effectiveness of teachers' teaching through increased student involvement, the provision of various learning options, as well as the diversity of teaching designs. However, the implementation of UDL still faces constraints in terms of teacher training, conceptual understanding, and institutional support. The analysis also found a gap between theory and practice, especially in the local context where there is still a lack of UDL-based training modules. Overall, this SLR shows that the success of the implementation of UDL depends not only on the understanding of teachers, but also on the ability of the education system to provide continuous professional support. The implications of the study suggest the development of a contextual teacher training module to strengthen inclusive teaching practices in Malaysia.

INTRODUCTION

Inclusive education is a key principle in ensuring that every student gets equal learning opportunities regardless of ability or background. In Malaysia, the implementation of inclusive education programs is growing in line with the aspirations of the Malaysian Ministry of Education (KPM) to improve access and quality of education for all students, including those with special educational needs. The Disabled Persons (OKU) Policy 2007 is the basis of equality of rights and opportunities for students with special education needs for full participation in society in guaranteeing their interests and well-being. Nevertheless, the implementation of inclusive education still faces various challenges, especially in the aspect of teachers' teaching in the classroom. Teachers are often faced with a diversity of ability levels, learning styles, and student needs that require a more flexible and responsive pedagogical approach.

Previous studies have shown that many teachers face difficulties in implementing inclusive teaching effectively due to constraints in terms of knowledge, pedagogical skills, and support resources (Singh, 2023).

The concept of Universal Design for Learning (UDL) has become an important pillar in efforts to strengthen the implementation of inclusive education around the world. This model emphasizes the principle that each student has his own uniqueness and the teaching process needs to be designed to meet that diversity during the planning stage (Meyer, Rose, & Gordon, 2014). In this context, the Universal Design for Learning (UDL) Model is a pedagogical framework that has the potential to help teachers implement inclusive teaching more effectively. UDL is a curriculum design approach based on the principle of universal access that emphasizes the need to provide a variety of ways that focus on 3 principles, namely i; involve students (engagement), ii; deliver information (representation), and iii; enabling students to express learning (action and expression). Through the application of this model, teachers can not only meet the needs of students with special educational needs, but also increase the effectiveness of teaching for all students in the class. Although the UDL model has received widespread attention at the international level, the level of understanding and implementation among teachers in Malaysia is still not widespread yet. Local studies show that many teachers have a positive attitude towards inclusive principles, but lack understanding and formal training in the systematic application of UDL (Jalaluddin & Tahar, 2022). Therefore, it is important to examine more deeply how this model has been applied in the context of education in various countries and how it affects the competence, attitude, and pedagogical practice of teachers in inclusive classes.

For this purpose, a research question was formulated to examine how the Universal Design for Learning (UDL) model supports teachers' instructional practices in inclusive classrooms. To answer this research question, a Systematic Literature Review (SLR) study was carried out using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to identify, analyze and synthesize empirical evidence related to the implementation of the UDL Model in the context of teacher teaching in inclusive classes. The findings of this SLR not only provide a deeper understanding of the potential of the UDL Model in supporting inclusive teaching, but also provide an empirical basis for the production of teaching materials or teaching approaches required by pupils with special educational needs in line with the intention of education for all.

METHODOLOGY

This study was carried out using the Systematic Literature Review (SLR) method using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. This analysis uses the literature method by searching and identifying articles related to the implementation of teachers' teaching based on the universal design of learning (UDL) model in inclusive classes. The PRISMA approach was chosen because it allows the researcher to make an in-depth literature assessment and it was found that this method allows the search for articles to be done based on clear and organized evidence. According to Matthew (2021), literature studies using PRISMA can show elements of transparency, consistency and high standards through certain processes that have been set.

Based on the research question that has been constructed, which is "How does the Universal Design for Learning (UDL) Model help teachers teach in inclusive classes?" Answers regarding the implementation of teacher teaching based on the universal design of learning (UDL) model in inclusive classes can be answered and discussed in the findings and discussion section of this study. The article search process is carried out in the databases, namely, ERIC, Scopus and Scispace. Search keywords are combined using Boolean operators as follows: ("Universal Design for Learning" OR "UDL") AND ("inclusive education" OR "inclusive classroom") AND ("teaching pedagogy" OR "teaching method").

The selection of articles is an important stage in this study. The results of the initial search for articles through the ERIC and SCOPUS databases produced as many as 40 articles and in Scispace which is a secondary database, there were as many as 15 articles. These articles were screened based on the inclusion and exclusion criteria that have been set. Refereed articles published are around 2000-2025. The selection of articles is limited during this period because the researcher wants to see search topics that revolve around current issues. In addition, the selected articles are articles that examine UDL in the context of inclusive education for students with special educational needs in primary schools and do not involve studies at the pre-school level. These criteria were chosen to fit the context of the study that focuses on teaching teachers in inclusive classes. Languages other than English are not

screened. From the total number of articles found through the three databases, which is 55 articles, it was found that there were 25 duplicate articles while 30 records were kept for screening. The researcher excluded as many as 5 articles that did not have full text and left as many as 25 records that needed to be screened at the stage of the qualification process.

In order to ensure that the quality of the selected articles is at a satisfactory level, a methodological quality assessment process was carried out on all articles that met the inclusion criteria. This assessment aims to reduce the risk of bias as well as ensure that only studies with sound research design are included in the final analysis. This practice is a basic principle in conducting a quality systematic literature review, where careful methodological evaluation helps to increase the transparency and reliability of the entire review process (De Cassai et al., 2025). Each article is evaluated based on several main criteria, namely the clarity of the study's objectives, the appropriateness of the study's design, the transparency of the data collection procedure, the strength of the data analysis, as well as the coherence between the study's findings and conclusions. Critical evaluation of these aspects reduces the risk of including weak or biased studies in evidence synthesis and is consistent with good practice in systematic reviews (Shaheen, 2023).

Next, the data synthesis method was implemented using the thematic analysis approach to identify recurring patterns and meanings across selected studies. This process begins with a repeated reading of each article to understand the context and key findings before the initial coding process is carried out. The codes that have similarities are then grouped into conceptual categories, further forming broader themes through a process of continuous comparison. The final theme is determined based on the frequency of findings, the strength of the empirical argument, as well as its relevance to the research question. To increase the reliability of the synthesis, researchers often ensure that each theme is supported by evidence from more than one research source in a systematic literature analysis (Naeem et al., 2023). This approach allows the findings of the literature to be systematically organized and produce a more meaningful interpretation of the studied phenomenon, such as the role of the Universal Design for Learning (UDL) Model in supporting teachers' teaching in inclusive classes.

After full reading and filtering according to detailed criteria, 10 articles were collected for study analysis. The selection process of this article is based on Figure 1 below:

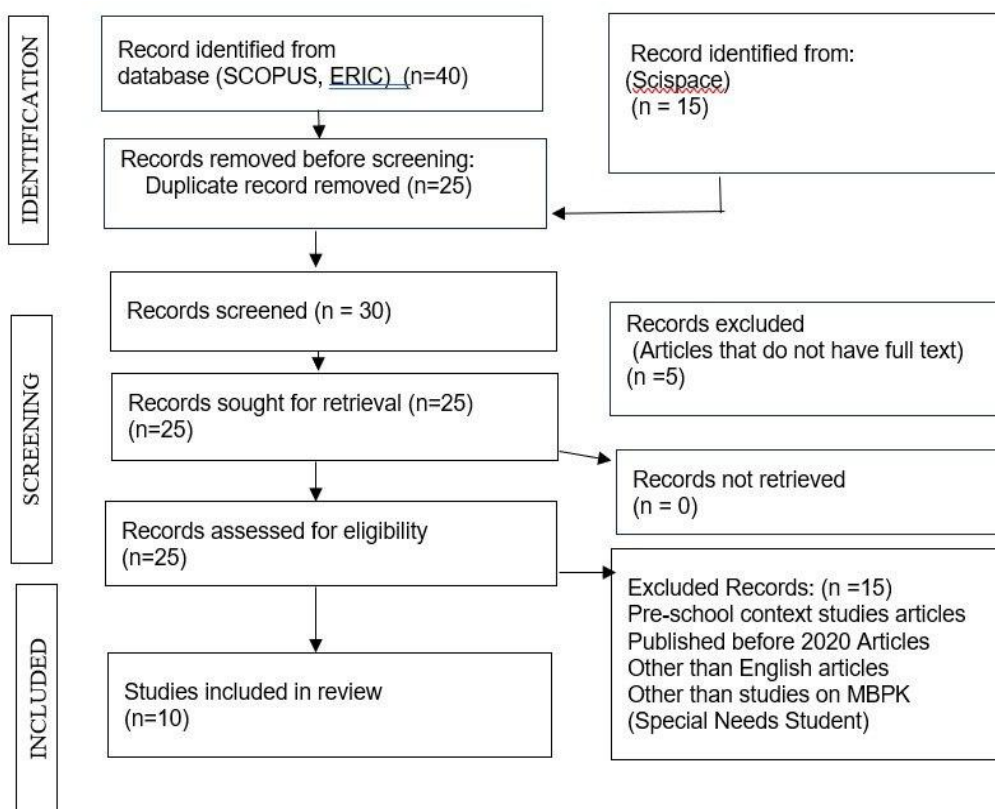


Figure 1. Flow diagram of the identification, screening, and included processes

RESULTS AND DISCUSSION

In order to carry out a systematic study, the selected articles are summarized as in Table 1 below:

Table 1. List of Research Articles

Bil	Author	Title	Method	Study Finding	Study Gap
1.	Han, C. & Lei, J. (2024)	Teachers' and Students' Beliefs towards UDL framework: A scoping review	Scoping review	Most teachers and students hold positive beliefs about UDL and see it as supporting inclusive practices.	Not evaluating the relationship of the actual practice of the teacher.
2.	Cumming, T. M. & Rose, M. C. (2022)	Exploring UDL as an accessibility tool in higher education: Review of current literature.	Literature review	UDL is seen as useful for increasing access and success for students with special needs.	There is no evaluation of the direct effect of UDL on teacher teaching.
3.	Thomas, E. R. (2023)	Universal Design for Learning within an Integrated MTSS/Tiered model in elementary schools	Mixed-methods	UDL is seen as mutually reinforcing: UDL helps Tier-1 achievement and reduces the need for intensive interventions.	Not assessing long-term effects on student learning.
4.	Fiona Mitchell (2023)	Promoting inclusive practice for autistic learners: Universal design for learning	Quantitative studies	Many teachers use some UDL principles but not always consciously or consistently.	There is no analysis of teacher training and the design of instructional modules that structurally support UDL.
5.	Qais Almeqd ad et al. (2023)	The effectiveness of universal design for learning: A systematic review & meta-analysis	Systematic review	UDL shows a positive impact on learning outcomes; support the implementation of UDL.	Lack of robust, large-scale data to evaluate implementation of UDL.

Continued

Bil	Author	Title	Method	Study Finding	Study Gap
6.	Saini et al. (2024)	UDL to Facilitate the Learning of Students with Intellectual Disabilities within the Inclusive Educational Context in Sarawak, East Malaysia.	Qualitative Methods	The strategies in the principles of UDL help meet the needs of students.	Absence of structured training modules for teachers.
7.	Luqman Hakim Sulaiman & Mohd Mokhtar Tahar (2024)	Implementation of Universal Learning Design Principles by Mainstream Teacher in Inclusive Education Programs.	Quantitative Methods	The level of implementation of the three UDL principles by mainstream teachers in the inclusive program is at a high level.	There is no training or module to reinforce the implementation of UDL.
8.	Frank Twum (2022)	Navigating Inclusion through Universal Design for Learning: Insights from a Ghanaian Special School.	Qualitative Methods	Most teachers are not aware of UDL as a formal framework but they use strategies that are consistent with UDL.	Lack of empirical evidence on the relationship between UDL strategies and student learning outcomes.
9.	Lambert, McNiff, Schuck, Imm & Zimmerman (2023)	“UDL is a way of thinking”: theorizing UDL teacher knowledge, beliefs and practices.	Quantitative Methods	Teachers are more confident and creative in adapting learning materials by using the UDL framework.	There is no instrument or module that can measure its effectiveness.
10.	Pfeifer et al. (2021)	Inside and Out: Factors supporting/hindering self-advocacy (ADHD/SLD) in STEM.	Qualitative Methods	UDL makes teaching more flexible and adaptable for students with special intellectual needs.	The study does not evaluate the teaching effectiveness of teachers who practice UDL.

This systematic study aims to examine how the Universal Design for Learning (UDL) Model can help teachers teach in inclusive classes based on the synthesis of 10 related and relevant articles from 2020

to 2025. Based on the analysis, UDL is seen as a pedagogical framework that not only emphasizes flexible teaching design, but also strengthens teachers' understanding of the diversity of students and the needs of each student. However, the findings of the study show that the implementation of UDL in the real context is still faced with various challenges that demand systematic training and professional development interventions.

From the 10 articles analyzed, it was found that there are three main themes that can be identified by the researcher:

- (1) The teacher's understanding of the needs of different students in inclusive classes,
- (2) The effectiveness of UDL in teacher teaching through student involvement,
- (3) The challenges of UDL implementation and research gaps.

Teachers' understanding of the needs of different students in the inclusive class.

Study by Lambert et.al. (2023) and Han & Lei (2024) found that UDL has been able to change the way teachers plan lessons that is from the same planning for all students to a form of learning that takes into account the differences of each individual. Teachers who use UDL principles are not only flexible in planning learning activities but show changes in the way they think, understand and implement teaching towards students in inclusive classes.

However, Cumming & Rose (2022) and Mitchell (2023) show that although teachers understand the concept of UDL, they do not practice teaching based on UDL continuously. This is due to most of them identifying the principles of UDL in general but not having the practical skills to apply it in the real context of the classroom. Most teachers use UDL elements unconsciously, especially in the form of differentiating teaching techniques but without a deep theoretical understanding. The implementation is fragmented (fragmented practice). This is in line with the findings of Luqman Hakim Sulaiman & Mohd Mokhtar Tahar (2024) who show variations in the level of implementation between the principles of 'engagement', 'representation', and 'expression'. This situation shows that UDL has been accepted at the idea level, but has not been fully practiced as a teacher's professional practice. Overall, this shows that teachers' understanding of UDL has not yet been translated into teachers' teaching practices.

The effectiveness of UDL in teacher teaching through student involvement.

The study by Thomas (2023) is in the form of an assessment of the effectiveness of the integration of UDL in the Multi-Tiered System of Support (MTSS) in primary schools. The study shows a significant increase in the level of student engagement, especially when teachers apply the principle of multiple means of engagement. Pupils are more enthusiastic because they have the option to learn through activities that suit their learning styles according to their individual needs. A study by Mitchell (2023) that examined teachers' practices in supporting autistic students found that student engagement when teachers use the UDL approach that provides a clear but flexible learning structure. By providing a variety of task options and forms of communication, students with special educational needs can interact with other friends in a more inclusive environment and less dependent on individual assistance.

A study in Malaysia by Saini et al. (2024) support this finding. In a study on students with intellectual special educational needs in Sarawak, teachers reported that the UDL approach allowed students to show progress in communication and socialization skills. Diverse and optional activities give them more space to be actively involved, while reducing reliance on traditional teacher-centered teaching strategies. However, there are also contradictions in this analyzed article. A meta-analysis study by Almeqdad et al. (2023) show that although many studies report positive results, the actual effect of UDL on academic achievement is still inconsistent. Some studies show a significant increase, while others show only a small increase in motivation with no effect on academic performance.

In addition, Pfeifer et al. (2021) stated that the effectiveness of UDL is highly dependent on teacher commitment and the level of institutional support. Without the support of resources and time for planning, teachers are unable to implement UDL optimally. The discrepancy between these positive and negative results shows that UDL is not a one-size-fits-all approach, but needs to be adapted to the structure and culture of the school itself.

UDL implementation challenges and research gaps.

A study by Twum (2022), shows that the implementation of UDL needs to be adapted to local resources and culture. Teachers in special schools face technological and training constraints, causing UDL principles to be implemented only at a basic level. This shows that there is a need to adapt the context, so that UDL easily becomes an ideal teaching concept to be applied by teachers in inclusive classes.

In the Malaysian context, Saini et al. (2024) pointed out that the implementation of UDL still faces the constraints of organizational structure and policy support. Teachers in special schools in Sarawak show a positive attitude towards UDL, but the lack of continuous training and reference materials makes its implementation incomplete. This study also shows that teachers need training modules that are adapted to local needs, not just copying foreign approaches.

According to Luqman Hakim Sulaiman & Mohd Mokhtar Tahar (2024) also emphasized that most teacher training in Malaysia is still short-term and lecture-based, not practical training involving real teaching design and reflection. Without a systematic training approach, the principles of UDL will only become a rule and not have an impact on teachers and students.

Cumming & Rose (2022) also added that the school environment that pressures teachers with administrative burdens and an inflexible curriculum makes UDL considered an "additional workload" and not a useful transformation for them. The discrepancy between the theoretical understanding and the reality of this practice shows that the implementation of UDL cannot be separated from the wider context of the education system which requires high commitment and effort from teachers.

CONCLUSIONS

This literature synthesis shows that UDL offers great potential for creating inclusive and responsive teaching. However, the discrepancy between teachers' understanding and actual implementation shows that the main challenge is not in theory, but in context and implementation. Many international studies prove the effectiveness of UDL in increasing student engagement, but local evidence is still limited and descriptive.

The theoretical implication that can be formulated is that the success of UDL depends on the ability of the education system to adapt universal design principles that meet local social and cultural realities. The research gap that still exists, especially the absence of empirical and contextual teacher training modules, opens up space for further research to develop evidence-based teacher training interventions capable of strengthening inclusive teaching practices in Malaysia. By filling this gap, the implementation of UDL can be seen as not just a teaching strategy, but a pedagogical transformation process that will provide structural changes, understanding in the educational ecosystem, especially for inclusive education.

Thus, there is a need to develop a teacher training module based on UDL. Such a module needs to combine universal design elements with local cultural, resource, and curriculum needs, and it even indirectly builds the capacity of teachers to plan truly inclusive lessons. A contextually designed training module can not only fill the gap between theory and practice, but also be a new contribution to the expansion of UDL theory in the local context. In addition, with the strengthening of teacher training and the development of structured modules, the implementation of UDL can develop from an ideal of teacher teaching to a transformation of professional practice that supports inclusive education.

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CONFLICT OF INTEREST

The author declares no conflicts of interest.

AVAILABILITY OF DATA AND MATERIALS

Data available within the article or its supplementary materials.

DECLARATION OF GENERATIVE AI

The authors declare that no generative AI was used in the writing of the manuscript.

ETHIC STATEMENTS

'Not applicable'.

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