

Strengthening Inclusive Education by Examining Factors Affecting Universal Design for Learning (UDL) Implementation in Elementary School: A Systematic Literature Review

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ABSTRACT

Universal Design for Learning (UDL) is widely recognized as a framework to foster inclusive education, yet its successful adoption in elementary schools depends on multiple contextual and motivational factors. This study investigates how UDL is implemented and what drives teachers to adopt its principles. A systematic literature review (SLR) was conducted following PRISMA guidelines. Four databases (Scopus, ScienceDirect, Taylor & Francis, and ProQuest) were searched using defined keywords and Boolean operators. Studies published between 2014 and 2024 that addressed UDL implementation in elementary schools were considered. After screening and applying inclusion and exclusion criteria, 12 empirical studies were selected. Self-Determination Theory (SDT) was used as the analytical lens to examine how autonomy, competence, and relatedness influence teachers' motivation in adopting UDL. The synthesis identified key factors affecting UDL implementation, including teacher self-efficacy, knowledge of UDL principles, access to resources, professional development, and supportive school leadership. Teachers' motivation, shaped by psychological needs, played a decisive role in sustaining UDL practices. Reported benefits of UDL included improved student engagement, equitable access to learning, reduced barriers for learners with disabilities, and enhanced instructional flexibility for teachers. This review highlights that both psychological motivation and institutional support are crucial for effective UDL implementation in elementary schools. Strengthening teacher training, fostering collaboration, and ensuring adequate resources are essential strategies to promote inclusive classrooms. The study provides theoretical and practical insights for educators and policymakers seeking to advance inclusive education through UDL.

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1. INTRODUCTION

Education is a fundamental right for everyone, regardless of background, abilities, or circumstances. This principle is enshrined in the (United Nations, 1948) and further emphasized by United Nations Sustainable Development Goal (SDG) 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015). Inclusive education is key to making this goal a reality. It ensures that every student, regardless of their learning differences, has access to the same educational opportunities. UNESCO (2017) highlights that inclusive education is essential for creating a more just and equitable society, where everyone, including those with disabilities, has the chance to succeed. It not only benefits individuals but also helps to build a society that values diversity and inclusivity.

However, the road to inclusive education is not without its challenges. Schools often face limitations in resources, teacher training, and sometimes even in understanding the various ways that inclusion can be implemented. These challenges make it difficult for many schools to create truly inclusive environments where all students feel supported. Despite these obstacles (Kurowski et al., 2022; Volker et al., 2023). Inclusive education also fosters a culture of diversity, where students learn to appreciate different perspectives and experiences, a skill that is vital in today's interconnected world.

One approach that has proven effective in addressing these challenges of inclusive education is Universal Design for Learning (UDL). UDL is a flexible teaching framework designed to meet the needs of all students, offering multiple ways to access content, engage with the material, and express their understanding (Meyer & Rose, 2014). Unlike traditional methods, which often require teachers to adapt lessons after identifying students' needs, UDL is built to be inclusive from the beginning (Novak, 2022). It provides diverse learning options, whether through visual, auditory, or kinesthetic approaches that allow teachers to address the varying learning styles and abilities in their classrooms (Meyer & Rose, 2014). This approach ensures that students, including those with disabilities, can engage meaningfully with the content without constant individual adjustments. UDL is particularly useful in elementary schools, because students are still developing essential cognitive, social, and emotional skills (Piaget, 1971). By providing various ways for students to engage with the material, UDL helps keep them motivated, regardless of their learning preferences or challenges.

Despite the clear benefits of UDL, its implementation is not always straightforward. A major barrier to its widespread adoption is a lack of adequate teacher training and support (Gravel, 2018; Thoma et al., 2023). Many teachers feel unprepared to implement UDL principles effectively because they have not received enough professional development in this area. As a result, they may struggle to create inclusive classrooms that fully utilize UDL strategies. Moreover, teachers' motivation plays a significant role in how successfully they adopt UDL. According to Self-Determination Theory (SDT) (Deci & Ryan, 2008) motivation is driven by the fulfillment of three core psychological needs: autonomy (the freedom to make choices about their teaching), competence (the confidence to successfully use teaching methods), and relatedness (a sense of connection with students and the school environment). When teachers' needs for autonomy, competence, and relatedness are met, they are more likely to be intrinsically motivated to adopt and sustain UDL practices (Deci & Ryan, 2000).

While previous research has focused on the benefits of UDL for students, there is a gap in understanding how teachers' motivation affects the implementation of UDL, particularly in elementary schools. This is a crucial gap because even when teachers know about UDL, their willingness to adopt it may depend largely on their intrinsic motivation. This study aims to fill this gap by exploring how teacher motivation, influenced by the psychological needs described in SDT, impacts the adoption of UDL. By focusing on these motivational factors, the study will provide valuable insights into how schools can support teachers in successfully implementing UDL, ensuring that all students have access to an inclusive and effective learning environment.

The research questions guiding this study are:

1. **RQ1:** What factors influence teachers' implementation of Universal Design for Learning (UDL) in elementary schools, according to Self-Determination Theory (SDT)?

2. **RQ2:** What are the benefits of UDL implementation for both teachers and students in elementary education?

This study will contribute to the existing literature on UDL by highlighting the importance of teacher motivation in the adoption of inclusive practices. It will also provide practical recommendations for schools and policymakers on how to support teachers in implementing UDL effectively. By understanding the motivational factors that drive teachers to adopt UDL, we can better equip them to create inclusive classrooms that support the diverse learning needs of all students.

2. METHODS

This study employs a systematic literature review (SLR) methodology to synthesize relevant research on Universal Design for Learning (UDL) and explore the factors influencing its implementation in elementary schools. The review follows established procedures, adhering to PRISMA guidelines (Moher et al., 2009) to ensure transparency and reproducibility in the study selection process.

2.1 Search Strategy

Articles for this review were selected from four major databases: Scopus, ScienceDirect, Taylor & Francis, and ProQuest. A combination of Boolean operators and search strings was used to identify studies focused on UDL in elementary school settings, with keywords such as "Universal Design for Learning," "teacher," "elementary school," and "primary school." The articles were first screened by reading the abstracts to determine relevance. If the abstract indicated alignment with the research questions, the full article was then reviewed for eligibility.

Table 1. Search String

Database	Search String	Result
Scopus	(ALL ("universal design for learning" OR UDL) AND ALL (teacher OR facilitator OR "primary school teacher" OR "homeroom teacher" OR "primary educator" OR educator OR instructor) AND ALL ("elementary school" OR "primary school" OR "grade school" OR "lower school") AND NOT ALL (kindergarten OR middle AND higher))	835
Science Direct	("universal design for learning" OR UDL) AND (teacher OR facilitator OR "primary school teacher" OR educator) AND ("elementary school" OR "primary school")	56
Taylor&Francis	("universal design for learning" OR UDL) AND ("teacher" OR "instructor" OR "educator") AND ("elementary school" OR "primary school") AND NOT ("kindergarten" OR "middle school" OR "higher education")	78
Proquest	("Universal design for learning" OR UDL) AND ("elementary school" OR "Primary school" OR "Grade school") AND ("Teacher" OR "Instructor" OR "Educator" OR "Facilitator") AND NOT (kindergarten* OR ("middle school" OR "middle schooler" OR "middle schoolers" OR "middle schooling" OR "middle schools") OR ("higher education" OR "higher educational" OR ("higher education" OR "higher educational" OR "higher educations"))).	88

Table 2. Eligible Criteria

Inclusion Criteria	Exclusion Criteria
<ol style="list-style-type: none"> The studies reviewed involve elementary school teachers, with an emphasis on those who have direct experience implementing Universal Design for Learning in their classrooms. Papers in English and Indonesia language Empirical studies, peer-reviewed study Grey Literature (dissertation/thesis/conference papers) 	<ol style="list-style-type: none"> The participants in the study were not teachers who are directly involved in the process of teaching elementary students. The participants were teachers in early school, kindergarten, middle school, and higher school Not empirical studies. Data was before January 2014 and after October 2024 Papers are not in English and the Indonesian language Data filters from January 2014 to 2024 will be used, except for the limitation set by the database.

The inclusion and exclusion criteria were designed to ensure that the selected studies were highly relevant and reliable for the research. For the inclusion criteria, the focus was on studies involving elementary school teachers who use Universal Design for Learning (UDL) in their classrooms, as these teachers are directly responsible for implementing UDL strategies. Only studies published in English or Indonesian were included to align with the researcher's ability to analyze them effectively and to capture both local and global perspectives. Empirical and peer-reviewed studies were prioritized to ensure the findings were evidence-based and credible. Grey literature, such as theses, dissertations, and conference papers, was also included to provide a broader view of available research and to avoid overlooking valuable insights that might not be published in traditional journals.

The exclusion criteria helped narrow down the selection to the most relevant studies. Research that did not focus on elementary school teachers, such as studies involving kindergarten, middle school, or higher education teachers, was excluded because teaching methods and challenges differ across educational levels. Non-empirical studies were excluded to focus on research that provided concrete evidence. Only studies published between January 2014 and October 2024 were considered to ensure that the data reflected current trends and also the UDL framework was published in CAST book (Meyer & Rose, 2014) outlined foundational principles of UDL, this period ensures that studies are aligned with the most current conceptualizations and applications of UDL in the classroom. Papers in languages other than English or Indonesian were excluded to avoid potential misinterpretation. In cases where database limitations restricted the date range, adjustments were made to ensure the inclusion of the most relevant data.

These criteria ensured that the research focused on recent, high-quality studies that were directly relevant to the use of UDL in elementary classrooms, helping to provide clear and reliable findings. After the screening and eligibility phases, the selected studies were synthesized using qualitative analysis to identify recurring themes and factors influencing UDL implementation, focusing on teacher motivation and contextual challenges.

This rigorous review led to the exclusion of 71 studies that failed to meet one or more of these criteria. Reasons for exclusion included studies that were non-empirical, studies that did not focus on UDL in elementary school settings, and studies involving participants outside the specified demographic. Ultimately, 12 studies were deemed eligible for inclusion based on their alignment with the research focus and adherence to the criteria.

To ensure reliability and validity, the research team kept a logbook documenting each step of the article selection and analysis process. Initially, articles were assessed based on relevance and alignment with the research questions through abstract reviews. A second-level evaluation involved multiple researchers independently reviewing the full texts. Discrepancies were resolved through discussion to ensure consistency in the selection and analysis, ensuring that only high-quality studies met the

inclusion criteria Regarding the inter-rater reliability, the process allowed multiple researchers to independently evaluate the articles, which significantly contributed to improving the consistency of the selection and analysis. As all researchers were involved in the decision-making process, we achieved a high level of agreement on the chosen articles, ensuring that personal biases did not influence the outcomes. This approach serves as an informal yet effective way to ensure inter-rater reliability, making certain that our findings were not reliant on the perspective of any single researcher.

In addition to this process, the research team performed a systematic search across four major databases. We utilized Rayyan AI as a tool to assist in the screening of articles. Despite an extensive search, only 12 articles met the necessary criteria to address the research question. This limited number of selected articles was a result of the focused nature of our research, which required studies that directly aligned with the objectives of our review.

By using Rayyan AI, we were able to efficiently identify the most relevant studies for analysis, ensuring that the selected articles were of high quality and rigor. The collaborative approach, combined with the use of Rayyan AI, reinforced the credibility of our study and ensured a transparent and consistent article selection process. Here is the PRISMA diagram showing how the article is assessed.

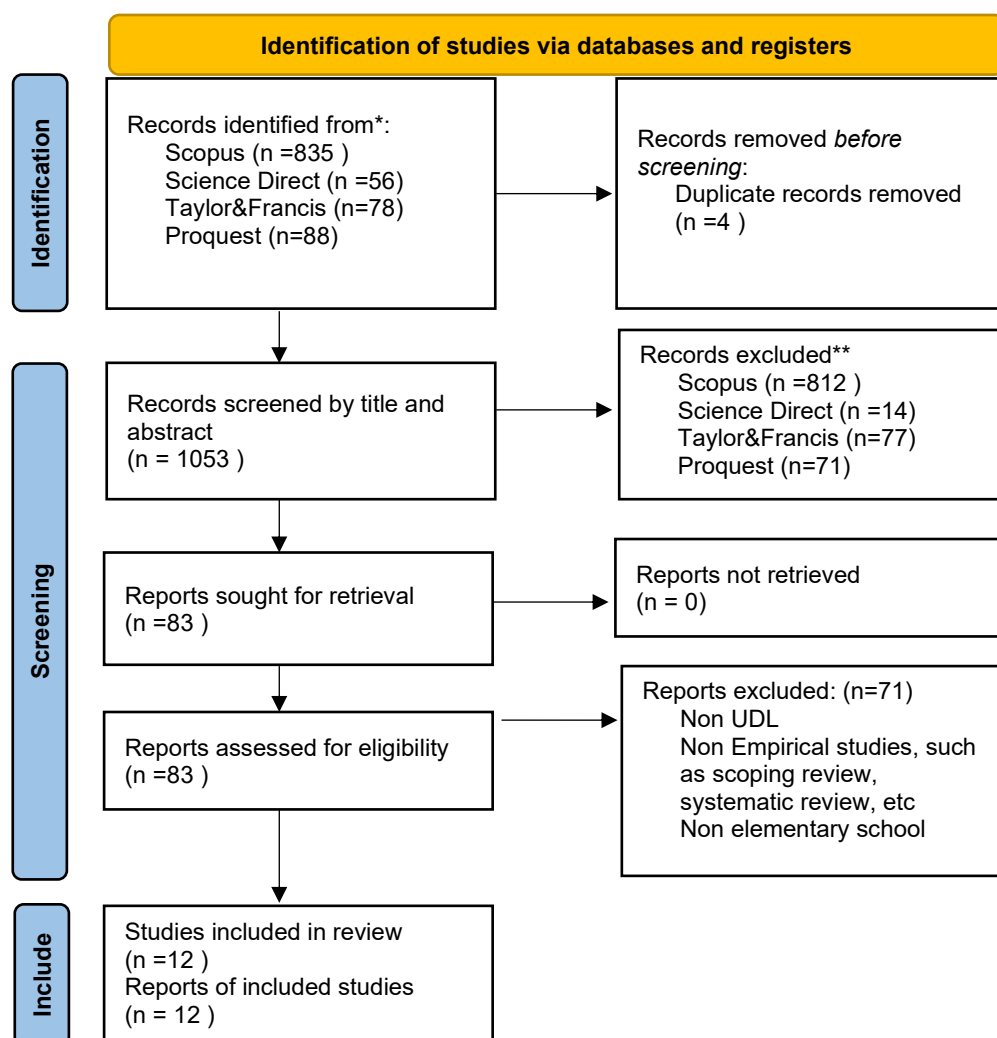


Figure 1. PRISMA diagram

3. FINDINGS AND DISCUSSION

Based on the selection result, there were 12 articles that met the criteria. The analysis of these articles involved a meta-synthetic approach. Six studies were research articles employing qualitative, quantitative, or mixed-methods approaches. Among the qualitative research articles, methodologies included content analysis (e.g., Teaching STEAM through Universal Design for Learning in Early Years), case studies with observations and interviews (e.g., Going Deep: Leveraging Universal Design for Learning), and participatory research studies (e.g., Cultivating Positive Classroom Environments). Two quantitative research articles utilized survey-based methodologies with statistical analysis, examining elementary teachers' UDL knowledge in Saudi Arabia and the application of UDL principles for students with learning disabilities. Additionally, one research article employed a mixed-methods approach, integrating qualitative and quantitative analyses to explore UDL in a multitiered system of support.

The review also identified five doctoral dissertations, all employing qualitative methodologies, such as case studies (e.g., Teacher Perspectives of Fidelity With Universal Design for Learning in the Classroom), action research (e.g., Supporting Teachers' Understanding and Implementation of Universal Design for Learning), and phenomenological studies (e.g., Silver Bullet or Trojan Horse? A Phenomenological Exploration of Universal Design for Learning). Another qualitative dissertation utilized interviews and document analyses to study instructional practices in mathematics education. Lastly, an original applied research paper analyzed UDL's framework for inclusion in outdoor learning through conceptual and descriptive case studies. Together, these works reflect diverse research designs that contribute to the theoretical and practical understanding of UDL implementation and its impact in education. These studies demonstrate the diversity of methodological approaches applied to understanding and implementing UDL. The research highlights both the theoretical and practical aspects of UDL implementation in elementary school settings.

Table 3. Included Studies Table

No	Title, author, and year	Factors influencing UDL implementation by teachers	The benefit of UDL
1	Teaching STEAM through universal design for learning in early years of primary education: Plugged-in and unplugged activities with emphasis on connectivism learning theory; (Thoma et al., 2023)	Teacher collaboration and professional development.	For students: 1. Reduce barriers by proactively planning instruction that is accessible and engaging to a broad range of students. 2. UDL ensures that students of all abilities can access the curriculum in meaningful ways by offering multiple ways to engage, learn, and express knowledge, fostering a more inclusive environment For teacher: 1. Enhancing teacher personal growth.
2.	Assessing the Knowledge of elementary school teachers on universal design for learning in Saudi Arabia. (Almutairi &	1. Teacher self efficacy 2. Teacher self-regulation 3. Teacher understanding of the cultural background of students 4. Teacher knowledge and awareness of UDL 5. Teacher training and profesional	For students: 1. Increased accessibility for students variability 2. Enhanced learning outcomes. 3. Improving self confidence. 4. Development of key skills For teacher:

	Alsuwayl, 2023a)	development 6. Teacher resource and support 7. Teacher collaboration 8. Administrative support and policy	1. Enhance profesional teacher growth 2. Enhance teaching flexibility
3	Going deep: Leveraging universal design for learning to engage all learners in rich disciplinary thinking in ELA. (Gravel, 2018)	1. Teacher professional development. 2. Teacher collaboration. 3. Understanding of learner differencies. 4. School culture that embraces UDL	1. Improved classroom management.
4.	Universal design for learning- a framework for inclusion in outdoor learning. (Kelly et al., 2022)	1. Teacher educational background and training. 2. Teacher profesional learning communities. 3. Teacher understanding UDL.	For students: 1. Equitable access to learning 2. Development of essential skills 3. Positive learning experience in nature For teacher: 1. Enhanced teaching practice 2. Increased students engagement and motivation 3. Reduced need for individualized education programs.
5.	Cultivating Positive Classroom Environmets: Exploring the Efficacy of Immersive Technologies in Removing Barriers to Learning Among Primary School Students. (Molloy & Farrell, 2024)	1. Teacher mindset 2. Teacher perceived value of UDL 3. Teacher access to resources as potential influences on UDL implementation.	For students: 1. Increased Motivation and Self-Efficacy. 2. Improved learning outcomes 3. More engaging learning experience For teacher: 1. Creation of inclusive classroom.
6.	Universal Design for Learning within an Integrated Multitiered System of Support. (Thomas et al., 2023)	Supportive school culture	For students: 1. Equitable access of learning 2. Development of self regulation and agency. 3. Improved learning outcomes. For teacher: 1. Supporting diverse learners Increased students engagement 2. Reduced need for extensive modification

7.	Instructional Practices Teachers Use to Improve Elementary School Students. (Atkinson, 2023)	<ol style="list-style-type: none"> 1. Teacher training and professional development 2. Time Constraint 3. Administrative support and resource 	<p>For students:</p> <ol style="list-style-type: none"> 1. Improved engagement and motivation 2. Personalized learning experience 3. Development self-regulation. <p>For teacher:</p> <ol style="list-style-type: none"> 1. Reduced challenging behavior 2. Facilitated differentiated instruction 3. Support inclusive classroom.
8.	Universal design for learning principles and students with learning disabilities: an application with general education teachers in Saudi Arabia. (Mohamed et al., 2022)	<ol style="list-style-type: none"> 1. Teacher knowledge and skill in teaching. 2. School environment and resources. 3. Teacher attitude and beliefs 	<p>For students:</p> <ol style="list-style-type: none"> 1. Increased access for learning 2. Enhanced engagement and motivation. <p>For teacher:</p> <ol style="list-style-type: none"> 1. Enhanced teaching effectiveness. Greater confidence in addressing diverse needs.
9	Supporting teachers' understanding and implementation of Universal Design for Learning (UDL) for student engagement through transformational leadership: one school's journey. (Syre-Hager, 2022)	<ol style="list-style-type: none"> 1. Teacher beliefs and perceptions. 2. Teacher access to professional development. 3. Administrative support and school culture. 	<p>For teacher:</p> <p>Increasing teacher efficacy.</p>
10	Silver Bullet or Trojan Horse? A Phenomenological Exploration of Universal Design for Learning and Teachers' Sense of Self-Efficacy in an Inclusive Classroom Brown. (Atkinson, 2023)	Teacher self-efficacy	<p>For students:</p> <ol style="list-style-type: none"> 1. Improved access and engagement in learning 2. Enhanced motivation and ownership. <p>For teacher:</p> <ol style="list-style-type: none"> 1. Increased sense of efficacy 2. More engaging and effective teaching.
11	Teacher Perspectives of Fidelity with Universal Design for Learning in the Classroom. (Hamilton, 2020)	<ol style="list-style-type: none"> 1. Teacher perceived lack of resources for UDL instructional strategies. Classroom management 	<p>For teacher:</p> <ol style="list-style-type: none"> 1. A teacher can minimize the need for constant adaptations and modifications after the fact. 2. Enhanced Observation of Student Progress <p>For Students:</p> <ol style="list-style-type: none"> 1. Increased Engagement and Success. 2. Access to a Range of Learning Options. Real-World Application

12	Supports and Barriers to Universal Design for Learning Implementation: Elementary Teachers' Perceptions of Support Required From School Principals. (Heiligenthaler, 2020)	<ol style="list-style-type: none"> 1. Knowledge and Training of UDL 2. Teachers need adequate training on UDL principles, strategies, and how to adapt their teaching practices to meet diverse learner needs. 3. Teacher Age and Experience. 4. Perceived Benefits of Inclusion 5. Systemic Support, like administrative backing, access to resources, and a school culture that values inclusion and diversity. 	For Teachers: <ol style="list-style-type: none"> 1. Enhanced Teaching Practices 2. Improved Student Engagement For Students: <ol style="list-style-type: none"> 1. Equitable Access to Learning: 2. Personalized Learning Experiences 3. Development of 21st-Century Skills
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Discussion

The results of this study highlight that teacher motivation and support systems play a pivotal role in the successful implementation of Universal Design for Learning (UDL). When examined through the lens of Self-Determination Theory (SDT) (Deci & Ryan, 2000), we gain a deeper understanding of how teachers' psychological needs influence their teaching practices, especially in adapting UDL methods in the classroom. These factors contribute significantly to creating a motivated and effective teaching approach, which is crucial for building inclusive and supportive learning environments (Griful-Freixenet et al., 2021).

The first psychological need identified by SDT is autonomy, which is essential in motivating teachers to adopt UDL practices. As Alquraini et al. (2018) note, autonomy is the ability to make independent decisions in teaching will greatly enhances teachers' intrinsic motivation, encouraging them to engage more meaningfully with inclusive teaching strategies. Teachers who have the freedom to shape their instructional approaches tend to be more proactive in incorporating UDL principles into their practices (Almutairi & Alsuwayl, 2023b; Alquraini & Rao, 2020). This sense of autonomy empowers educators to approach UDL with creativity and confidence, closely linked to another important factor: teacher self-efficacy (Almutairi & Alsuwayl, 2023; Tschannen-Moran & Hoy, 2001)

Self-efficacy is the belief in one's capability to effectively manage teaching tasks. Teachers who have high self-efficacy are more likely to feel confident in applying UDL methods (Almutairi & Alsuwayl, 2023) They trust their ability to meet diverse student needs through tailored instruction. Additionally, teachers with a growth-oriented mindset, which promotes flexibility and resilience, tend to foster a greater sense of autonomy in implementing inclusive practices (Molloy & Farrell, 2024). Such teachers believe in their own growth and in the possibility of all students thriving, which leads them to embrace UDL methods more willingly, enhancing student participation and engagement.

Moreover, the availability of resources plays a crucial role in enabling teachers' autonomy in UDL implementation. (Hamilton, 2020) emphasize that a lack of essential resources can significantly limit teachers' ability to effectively incorporate UDL strategies. When teachers have adequate resources, they feel more empowered to make informed and autonomous instructional decisions. Furthermore, teachers' perceptions of UDL's value play a role in their willingness to adopt these practices. (Molloy & Farrell, 2024) found that teachers who recognize UDL's positive impact on student learning are more committed to integrating it into their teaching. These insights suggest that enhancing teachers' understanding and appreciation of UDL can foster greater autonomy and enthusiasm for inclusive education (Priyadharsini & Sahaya Mary, 2024)

Competence, the second psychological need in SDT, refers to teachers' sense of confidence in their ability to effectively apply UDL practices. Teachers who feel competent in UDL are more likely to implement these strategies successfully. The findings of this study indicate that teachers' educational background and professional development experiences significantly contribute to their sense of

competence. Teachers with a solid educational foundation and exposure to UDL during their training are better equipped to apply these principles in diverse classroom contexts (Kelly et al., 2022). Professional development is key to reinforcing teachers' skills and UDL knowledge, as continuous learning allows them to refine and adapt their inclusive teaching practices over time. It also stresses that an understanding of learner variability, central to UDL, strengthens teachers' confidence in designing instruction that meets the needs of all students (Alquraini & Rao, 2020).

Relatedness, the third psychological need according to SDT, emphasizes the importance of collaboration and support in UDL implementation. Teachers who collaborate, especially within professional learning communities, gain valuable insights and strategies to tackle inclusive education challenges (Thoma et al., 2023). Collaboration fosters a sense of shared responsibility for student inclusion and improves teachers' collective approach to UDL. This study also reveals that a supportive school environment, including strong administrative backing, is essential for sustaining UDL practices. (Syre-Hager, 2022) highlight that teachers who feel supported by their school's leadership and inclusive policies are more motivated to use UDL principles. Supportive policies and adequate resources from school administration are crucial to maintaining teachers' engagement in UDL practices, which contributes to the development of more inclusive classrooms (Alzyoud et al., 2014)

For schools facing resource limitations, several practical strategies can facilitate UDL implementation. Teachers can utilize Open Educational Resources (OER), which provide free access to a wide range of teaching materials adaptable to various student needs (Orr et al., 2015). OER reduces costs while enabling teachers to create flexible lesson plans aligned with UDL principles. Peer collaboration is also crucial; teachers can share materials and strategies, creating a collective learning environment that lessens individual burdens and fosters inclusivity (Thoma et al., 2023). By adapting existing resources, such as digital tools or multimedia content, teachers can cater to different learning styles and engage students in diverse ways (Meyer & Rose, 2014)

Policymakers have an essential role in supporting UDL implementation. One recommendation is to establish resource-sharing networks among schools, allowing institutions to exchange teaching materials and professional development opportunities, thus lowering costs for schools with fewer resources (Hamilton, 2020). Furthermore, investing in professional development focused on UDL and accessible assistive technologies can enhance teachers' ability to adopt inclusive practices, even in resource-limited settings (Thoma et al., 2023). Additionally, integrating UDL principles into national or regional educational policies can create a comprehensive framework that promotes inclusivity across all schools, regardless of their financial constraints (Alquraini & Rao, 2020). These strategies align with broader educational policy reforms aimed at improving equity and access in education (Everett & Oswald, 2018)

Finally, policymakers should prioritize the development and implementation of low-cost, versatile assistive technologies that effectively support students with diverse learning needs. This would help ensure that all schools can successfully integrate Universal Design for Learning principles, even in the face of limited budgets. Such adaptive technologies have the potential to significantly enhance the overall learning experience for students with disabilities, making UDL based instruction more accessible and inclusive for all learners (Meyer & David Gordon, 2024). Investing in these flexible, affordable solutions can unlock the full benefits of a UDL approach, empowering schools to better accommodate a wide range of student abilities and learning styles (Piticari, 2023). In conclusion, the successful implementation of UDL hinges on both teachers' autonomy, competence, and relatedness, as well as supportive policies and resource-sharing initiatives. These findings underscore the need for a holistic approach that includes both practical classroom strategies and institutional support to create inclusive and equitable learning environments for all students (CAST, 2024). By focusing on improving teacher motivation, offering continuous professional development, and ensuring policy and resource support, educational systems can make meaningful strides toward inclusive education that benefits both teachers and students alike

This study offers important insights into factors affecting teachers' use of Universal Design for Learning (UDL), but its findings may have limited generalizability. Contextual factors, like regional policies, resource availability, and cultural views on inclusion, vary widely and can impact UDL implementation. For instance, findings from a well-funded school district may not capture the experiences of educators in lower-resource or rural areas, where access to materials and support is often constrained (Heiligenthaler, 2020). Further research across diverse educational settings could strengthen the applicability of these findings.

4. CONCLUSION

This study significantly advances the field of Universal Design for Learning research by providing a deeper understanding of how key components of Self-Determination Theory, such as teacher motivation, autonomy, competence, and relatedness, play a pivotal role in the successful implementation of UDL. Through an examination of these psychological needs, the study elucidates both internal and external factors that influence teachers' adoption of UDL practices. The findings highlight the importance of fostering a supportive environment where teachers feel autonomous, competent, and connected to their peers and administrators, as this directly impacts their ability to implement inclusive teaching strategies. In terms of policy, concrete actions are necessary to ensure widespread UDL adoption; for instance, governments should fund mandatory UDL training as part of teacher certification, and schools should establish resource-sharing networks to alleviate the burden on under-resourced institutions.

Additionally, future research should explore geographical and cultural contexts that remain underexplored, particularly in regions with diverse educational challenges, such as rural or economically disadvantaged areas. Furthermore, more research is needed on the long-term effects of UDL implementation on student outcomes, especially in classrooms that embrace diversity and inclusivity. Overall, this study represents a significant step forward in understanding the complex factors that influence UDL adoption, and the findings have important implications for policy, practice, and future research.

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