Universal Design for Learning (UDL) in Higher Education Institutions (HEIs): Enablers and Disablers

Daniel L. Mpolomoka[1*], Mohammad A. Beirat[2], Christine Mushibwe[3], Rose Chikopela[4], Prisca Phiri[5]
[1]Unicaf University Zambia, School of Education, Humanities and Social Sciences. mpolomokadl@gmail.com
ORCID ID: https://orcid.org/0000-0002-2479-2693
[2]Faculty, of Educational Sciences, Department of Special Education, Al Hussein Bin Talal University,
beirat@ahu.edu.jo ORCID ID: https://orcid.org/0000-0001-8730-6405
[3] Unicaf University Zambia, Vice Chancellor,
ORCID ID: https://orcid.org/0000-0002-7569-1665
[4] Chalimbana University, School of Education, rchikopela@yahoo.com
ORCID: https://orcid.org/0009-0000-0160-5843
[5] Evelyn Hone College of Arts and Applied Sciences, mwasesulo@gmail.com
ORCID: https://orcid.org/0009-0003-4055-3259
*Corresponding author's Email: mpolomokadl@gmail.com

Abstract
This paper investigates Universal Design for Learning (UDL) in Higher Education Institutions (HEIs) by specifically targeting enablers and disablers. Databases from ERIC, JSTOR and Google Scholar, as well as institutional repositories and grey literature from governmental and non-governmental organizations were used to identify appropriate studies. The combined effect estimates for each outcome were computed in Meta XL using random effects. Drawing on data from 25 empirical studies, policy analyses, and institutional reports published between 2010 and 2024, the study identifies key enablers such as committed institutional leadership, aligned national education policies, and focused capacity-building initiatives for educators. However, significant disablers persist, including insufficient resources, inadequate infrastructure, and limited faculty expertise in UDL principles. Effect size calculations reveal the extent to which these factors facilitate or hinder UDL adoption. The findings underscore the importance for coordinated policy interventions, institutional support and sustained faculty development to ensure the successful integration of UDL, as well as highlighting the challenges posed by systemic resource constraints and fragmented policy enforcement. This research shall enrich educators, policymakers, and stakeholders seeking to enhance the accessibility and inclusiveness of Zambia's higher education system. The study recommends addressing systemic issues such as poverty, lack of access to technology and cultural barriers that can impede the effective implementation of UDL. Thus, HEIs can create a more equitable and inclusive learning environment for all students.
Key words: *Disablers, Enablers, Faculty Development, Universal Design for Learning (UDL), Higher Education Institutions (HEIs)*

INTRODUCTION

The pursuit of inclusive education in higher education institutions (HEIs) has gained momentous traction globally in recent years. Central to this movement is the implementation of Universal Design for Learning (UDL), a pedagogical framework aimed at addressing the diverse learning needs of students, irrespective of their abilities. UDL provides a structure for creating learning environments that offer multiple means of engagement, representation, and expression, with the goal of ensuring that all students, regardless of their backgrounds or disabilities, can participate and succeed. This study examines enablers and disablers that impact the implementation of UDL in HEIs, detailing factors that either promote or hinder its adoption.

The UDL framework was developed from principles of universal design, initially applied in architecture to ensure that physical environments were accessible to all individuals, including those with disabilities. Its application to education was pioneered by scholars such as David Rose and Anne Meyer, who argued that teaching strategies should be flexible and accessible to students with different learning styles and abilities (Meyer, Rose & Gordon, 2014; Tatham-Brown, 2024). UDL seeks to create an educational environment where diversity is not an afterthought but is embedded in the design of learning processes. HEIs, faced with increasingly diverse student populations, have turned to UDL as a tool for fostering greater inclusivity in their academic programs. However, the successful implementation of UDL remains uneven, and its potential has not been fully realized in many institutions. The reasons for this are complex and multifaceted, involving a range of institutional, pedagogical, and technological factors.

A key enabler of UDL implementation in HEIs is institutional support. Commitment at the organizational level,

expressed through policies and resource allocation, creates an environment where UDL can flourish. HEIs that invest in training for faculty, provide technological infrastructure, and promote UDL as part of their institutional mission tend to see more successful integration of the framework (Naeem, 2024). Leadership within institutions is also critical; where senior administrators champion inclusive education practices, faculty is more likely to adopt and implement UDL strategies.

The availability of technology has further enabled the implementation of UDL. Digital tools such as online platforms, multimedia content, and adaptive learning technologies have made it easier for educators to design courses that meet the needs of diverse learners. Technology, in this context, plays a key role in actualizing the UDL principle of providing multiple means of representation - allowing students to access content in a variety of formats (Gresham & Robichaux, 2012; Walkowiak, 2025). Moreover, professional development opportunities that focus on the practical application of UDL have been shown to enhance faculty confidence and competence in adopting these inclusive teaching practices. Faculty members who understand the potential benefits of UDL and have access to the necessary resources are more likely to integrate these strategies into their teaching. Equally significant is the attitudinal shift towards inclusivity among educators. Faculty members who recognize the value of creating inclusive learning environments are more inclined to navigate, adopt and popularize UDL strategies. This cultural shift within HEIs, towards valuing diversity in all its forms, can create an atmosphere where UDL is embraced not only as a pedagogical tool but as a broader institutional commitment to inclusion.

Although there are numerous enablers of UDL, several barriers persist, hindering its widespread adoption in HEIs. A primary challenge is the lack of awareness and understanding of UDL principles among faculty and administrators. Research has shown that many educators remain unfamiliar with UDL or are unsure how to implement its strategies effectively in their teaching. Without a solid grasp of the framework, educators may resist adopting UDL due to perceived complexity or a lack of clarity regarding its practical benefits (Edyburn, 2010; Summer, 2025; Echeles, et. al., 2025). This knowledge gap is compounded by institutional cultures that often prioritize traditional, lecture-based methods of teaching, which can be at odds with the more flexible, student-centered approaches advocated by UDL (Hitch, Macfarlane & Nihill, 2015).

Another significant disabler is the resource-intensive nature of UDL implementation. In as much as technology can facilitate UDL, the financial cost of acquiring and maintaining the necessary tools and platforms can be prohibitive, especially for institutions operating with limited budgets. Even where technology is available, insufficient training or support for faculty can undermine its effectiveness, leading to uneven implementation of UDL strategies (Banker, 2023). Furthermore, structural constraints within HEIs such as large class sizes, inflexible curricula and limited time for course development can further complicate efforts to implement UDL.

Institutional culture and attitudes also play a significant role in limiting UDL's adoption. In some HEIs, there is resistance to pedagogical change, with faculty members hesitant to move away from established teaching methods. This resistance is often rooted in concerns about academic rigor and the perception that UDL requires a fundamental shift in how courses are structured and delivered (Machado, 2023; Walkowiak, 2025). Without strong leadership and clear institutional policies that promote inclusivity and UDL, these attitudes can create significant barriers to change.

The lack of a coordinated institutional approach to UDL can result in inconsistent implementation across different departments and faculties. When UDL is not prioritized at an institutional level, its adoption is left to the discretion of individual educators, leading to varying degrees of commitment and effectiveness in applying its principles. This inconsistency undermines the broader goals of UDL, as students in the same institution may have very different learning experiences depending on the courses they take and the educators they encounter.

This paper contributes to the growing body of literature on UDL by synthesizing existing research on the factors that enable and disable its implementation in HEIs. Through examining both the facilitators and barriers to UDL adoption, this study provides valuable advice for policymakers, educators and administrators seeking to foster more inclusive learning environments. The findings underscore the importance of institutional commitment, technological resources and cultural change in promoting UDL. They also bring to the fore challenges that remain, particularly in terms of faculty training, resource allocation and institutional resistance. As a result, understanding these dynamics is essential for advancing the goals of inclusive education and ensuring that HEIs can meet the diverse needs of all their students.

The Backdrop
The Zambian higher education system, despite recent policy initiatives aimed at fostering inclusive education,

continues to struggle with effectively addressing the needs of students with disabilities. The Persons with Disabilities Act of 2012 emphasize equal access to education for all, yet the practical implementation of these inclusive ideals remains inadequate, particularly in HEIs. The traditional methods of instruction, predominantly lecture-based and inflexible, have proven insufficient in accommodating students with disabilities or those with varying learning needs. As a result, many students find themselves marginalized or excluded from full participation in academic life (Chanda, 2021). One of the major challenges lies in the limited understanding and application of UDL, a framework that could significantly address these gaps. UDL advocates for designing learning environments that offer multiple means of engagement, representation, and expression, ensuring that all students can succeed regardless of their individual needs (Muzata, 2014; Stefaniak, et. al., 2024; Kaplitz, 2024; Nawire, et. al., 2025). However, in Zambian, UDL remains largely underutilized, with few institutions adopting its principles in any meaningful or systematic way.

The barriers to UDL implementation in Zambia are polygonal, and research has identified a lack of professional development for educators on inclusive teaching strategies as a noteworthy constraint. Most faculty members in HEIs have not received adequate training on how to design courses that cater to diverse learners, and this has protracted the reliance on conventional, exclusionary pedagogical approaches (Mercé, et. a., 2024; Edwards, 2024; Barnes, 2025). Inadequate resources financial and technological further undermine efforts to create accessible learning environments. Even where institutions are willing to embrace UDL, they often lack the necessary infrastructure to support it effectively. The institutional culture within HEIs also poses challenges. Many institutions in Zambia continue to emphasize traditional modes of teaching that prioritize uniformity and standardization, often at the expense of flexibility and inclusivity. As noted by Dabi & Golga (2024) this rigid approach not only impedes the adoption of UDL but also perpetuates exclusionary practices that disadvantage students with disabilities or learning difficulties. As a result, this study examined the enablers and disablers of UDL implementation in Zambia's higher education sector. Therefore, the current study provided an understanding of how Zambia can move towards a more inclusive higher education system.

The following research objectives guided the study:
1. To identify what promotes the implementation of UDL in Zambian HEIs.
2. To establish barriers to the adoption of UDL in Zambian HEIs.
3. To determine the institutional, pedagogical, and technological factors influencing UDL implementation in Zambian higher education.

Theoretical Framework
The theoretical framework underpinning this study is grounded in Universal Design for Learning (UDL) theory, which emerged from the broader concept of universal design in architecture and was adapted to education by scholars such as David Rose, Anne Meyer, and others associated with the Center for Applied Special Technology (CAST). UDL is built upon three key principles: (1) multiple means of engagement, (2) multiple means of representation, and (3) multiple means of action and expression (Rose & Meyer, 2002). These principles are aimed at addressing the variability in how learners are motivated, process information, and express their knowledge. UDL's overarching goal is to make education accessible and meaningful for all students by considering their diverse needs from the start. On the other hand, the theoretical foundation of UDL is heavily influenced by the Vygotskian perspective of social constructivism, which emphasizes the social contexts of learning and the critical role of scaffolding to support learners at various developmental stages (Vygotsky, 1978). This aligns with UDL's focus on providing flexible learning environments that accommodate learners' individual differences. Vygotsky's ideas about the Zone of Proximal Development (ZPD) suggest that learners can achieve more with appropriate support than they can independently. UDL applies this principle by offering varied supports (e.g., scaffolding, differentiated instruction) that allow all learners to succeed in their learning journeys.

Additionally, UDL draws upon the work of cognitive neuroscience, particularly the recognition that learners differ in their cognitive processes. This scientific basis helps educators understand why flexibility in teaching and assessment methods is essential for fostering inclusion (Rose, Meyer, & Gordon, 2014; Echeles, et. al., 2025). UDL's emphasis on adaptability in curriculum design ensures that barriers to learning are removed, not only for students with disabilities but for all learners who might encounter challenges in accessing, engaging with, or demonstrating their learning. Moreover, in the context of Zambian HEIs, the UDL framework is particularly relevant because it provides a structured approach to designing inclusive learning environments, which can help address the systemic barriers that currently exist. Despite national and international mandates, the lack of a UDL-oriented approach continues to exclude many students. This study's theoretical framework seeks to apply UDL theory to analyze the enablers and disablers of its implementation, focusing on how institutional support, faculty attitudes, resource availability, and technological infrastructure influence inclusive teaching

practices in Zambia.

In anchoring this study in UDL theory, it provided a comprehensive lens through which to examine how higher education can be transformed to accommodate learners with disabilities. The study will also draw upon the Diffusion of Innovations theory by Rogers (2003), which sheds light into how new ideas and practices (such as UDL) spread within organizations. This framework might help explore how HEIs in Zambia adopt or resist UDL and what factors facilitate or inhibit this process. The combination of these theories offers a conceptual foundation for analyzing the dynamics of UDL implementation in Zambian higher education.

The rationale for this study stems from the urgent need to address the persistent inequities in Zambian higher education, where students with diverse learning needs remain underserved despite progressive legislative frameworks. UDL, a well-established model for fostering inclusivity, is underutilized in Zambia's HEIs. Given the growing recognition of UDL as an effective means to enhance access and participation for all students, this study investigated the enablers and disablers of its implementation. In doing so, it aimed to bridge the gap between policy and practice and advance inclusive education in Zambia.

LITERATURE REVIEW

This section begins with a global perspective, followed by a regional focus on Africa, and concludes with an analysis of the Zambian context. Thematic areas of the literature reviewed heavily lean on the three research objectives: identifying the enablers of UDL, understanding the barriers to UDL implementation, and assessing the institutional, pedagogical, and technological factors influencing UDL adoption.

Global Perspective

The adoption of UDL in higher education has been influenced by a growing awareness of the need for inclusive pedagogies that cater to diverse learners. UDL, conceptualized by David Rose and colleagues at the Center for Applied Special Technology (CAST), emerged as a framework to create more accessible learning environments by emphasizing multiple means of engagement, representation, and expression (Gresham, 2015; Kirsch, 2024; Summer, 2025). Its foundation in cognitive neuroscience and learning theory positions it as a dynamic approach that can address the varied needs of students, particularly those with disabilities or learning differences.

The key enablers of UDL globally include strong institutional leadership, robust policy frameworks, and professional development for educators. Research has consistently shown that when educational institutions actively promote inclusivity, UDL principles are more easily integrated into curricula (Kluge, 2024). Countries such as the United States and Canada, where national policies like the Individuals with Disabilities Education Act (IDEA) and provincial mandates support inclusive education, have witnessed more widespread implementation of UDL in higher education. Additionally, the availability of technological tools that facilitate multiple modes of learning has significantly advanced UDL practices in many developed nations. However, barriers to UDL implementation remain, even in well-resourced educational systems. Lack of awareness and training among faculty is frequently cited as a key disabler. Many educators continue to rely on traditional, lecture-based teaching methods, which are often incompatible with UDL's flexible, learner-centered approach. Insufficient institutional support, particularly in terms of funding and technology, hampers UDL adoption even in contexts where the theoretical framework is well understood.

The global literature also highlights the critical role of institutional, pedagogical, and technological factors in shaping UDL outcomes. Institutions that invest in faculty training and provide access to assistive technologies are more likely to successfully implement UDL. Pedagogically, UDL requires a shift from content delivery to learner engagement, necessitating changes in curriculum design and assessment practices. Technologically, advances in digital learning platforms, such as Learning Management Systems (LMS) with built-in accessibility features, have been pivotal in expanding UDL's reach in higher education (Burgstahler, 2015; Kirsch, 2024; Summer, 2025).

African Perspective

The adoption of UDL in African higher education is still in its infancy, with varying degrees of implementation across the continent. Even though many African countries have committed to inclusive education through policies aligned to international frameworks like the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), the practical application of UDL principles in universities and colleges remain limited (Chataika, Mckenzie, Swart & Lyner-Cleophas, 2012; Dalton, et. al., 2019; Lkhider, 2024).

Several enablers have been identified in African. First, national policies that advocate for inclusivity have laid the groundwork for UDL adoption. For instance, South Africa's White Paper 6 on Inclusive Education (2001) provides a robust policy framework supporting inclusive practices in higher education. Similarly, countries like Kenya and Ghana have enacted legislation aimed at promoting disability rights and inclusive education (Mulonda, 2017). These legal frameworks may not be specific to UDL, but create an enabling environment for its principles to be adopted in educational institutions.

In addition, donor support and international collaborations have been instrumental in promoting inclusive education initiatives in Africa universities. Organizations such as the World Bank and UNESCO have funded projects aimed at enhancing access to education for students with disabilities, and in some cases, these projects have included components that align with UDL principles. For example, technology-enhanced learning platforms funded by international donors have provided African universities with tools that facilitate multiple means of engagement and representation, key tenets of UDL (Mamun, 2024).

However, the disablers of UDL in Africa are numerous and deeply rooted in the structural challenges facing the continent's higher education systems (Banda & Mpolomoka, 2023; Moodley, 2024). A lack of resources both financial and technological is a significant barrier. Many universities in Africa operate with limited budgets, which restricts their ability to invest in the necessary technologies and training required to implement UDL. Additionally, there is a shortage of trained educators who are knowledgeable about UDL principles. Most faculty members in African universities have not received formal training in inclusive teaching strategies, making it difficult to shift away from traditional pedagogical models (Chataika, et. al., 2012; Luchembe, et. al., 2021; Chikopela, e. al., 2021; Muvombo, et. al., 2024; Chanda, et. al., 2024).

The institutional, pedagogical, and technological factors that influence UDL implementation in Africa are closely intertwined. Institutions that are better resourced and more open to pedagogical innovations are more likely to adopt UDL principles (Miyauchi, & Paul, 2020). However, the lack of adequate infrastructure, particularly in terms of access to digital tools and platforms, continues to be a major impediment to inclusive education across the continent. Pedagogically, there is a need for a paradigm shift in teaching approaches, moving from teacher-centered to learner-centered models, which is essential for UDL to be fully embraced in African higher education.

Zambian Perspective

In Zambia, the legal and policy frameworks necessary for promoting inclusive education are in place. For instance, the Persons with Disabilities Act of 2012 and the Education Policy emphasize the right to education for all citizens, including those with disabilities. Moreover, Zambia is a signatory to the UNCRPD, which mandates that signatories ensure inclusive education at all levels. However, despite these positive legislative frameworks, the practical implementation of UDL in Zambian Higher Education Institutions (HEIs) is still in its early stages (Chanda, 2021; Banda, et. al., 2023).

Enablers of UDL in Zambia are largely tied to policy mandates and advocacy efforts by civil society organizations. The Zambia Agency for Persons with Disabilities (ZAPD) has been at the forefront of pushing for more inclusive practices in education, and in some cases, this has translated into the adoption of UDL-like approaches in certain HEIs. Furthermore, international organizations such as UNESCO and the British Council have supported inclusive education projects in Zambia, some of which have incorporated elements of UDL.

However, Zambia faces significant challenges in fully embracing UDL. A major disabler is the lack of institutional capacity to support inclusive education initiatives. Most universities and colleges lack the financial resources to invest in the necessary technologies and infrastructure that would enable UDL (Johnson and Muzata, 2019; Chanda, et. al., 2024). Furthermore, faculty training in inclusive pedagogies remains insufficient. Many educators in Zambia's HEIs continue to use traditional, lecture-based teaching methods, which are often exclusionary and fail to address the diverse needs of students. Institutional factors play a crucial role in determining the success of UDL in Zambia. Despite some HEIs having made strides in promoting inclusive practices, many are still hindered by outdated policies, insufficient funding, and a lack of leadership commitment to UDL implementation. Pedagogically, there is a need for a cultural shift in how teaching and learning are perceived. The dominant model in Zambian HEIs is still teacher-centered, which contrasts sharply with the learner-centered focus of UDL. Technologically, many institutions are ill-equipped to provide the tools necessary for UDL, such as accessible learning management systems and assistive technologies (Chanda, 2021).

METHODOLOGY

This study used a meta-analysis research design to explore the enablers and disablers of UDL implementation in HEIs, with a focus on Zambia. By combining quantitative and qualitative data from multiple studies, the research

aimed to identify patterns and trends influencing UDL adoption. To ensure the relevance and quality of included studies, specific criteria were applied. These included focusing on UDL implementation in higher education settings, prioritizing studies from the African context and Zambia, and considering both qualitative and quantitative research designs. Studies published between 2010 and 2024 were prioritized to reflect contemporary practices and trends.

Data was collected from academic databases such as ERIC, JSTOR, and Google Scholar, as well as institutional repositories and grey literature from governmental and non-governmental organizations. A strategic search strategy employing keywords and Boolean operators were used to capture relevant studies.

Identification of studies by databases

Identification		
Records identified from*: ERIC (n = 50) JSTOR (n = 65) Repository (n = 15) Google Scholar (n = 20)	→	Records removed *before screening*: Duplicate records removed (n = 30) Records marked as ineligible by automation tools (n = 70) Records removed for other reasons (n = 25)

Screening		
Records screened (n = 150)	→	Records excluded (n = 125)
Reports sought for retrieval (n = 15)	→	Reports not retrieved (n = 5)
Reports assessed for eligibility (n = 20)	→	Reports excluded: Did not grip HEIs (n = 7) No attention on UDL (n = 4) Lacked empirical data (n = 6) Not peer-reviewed (n = 3)

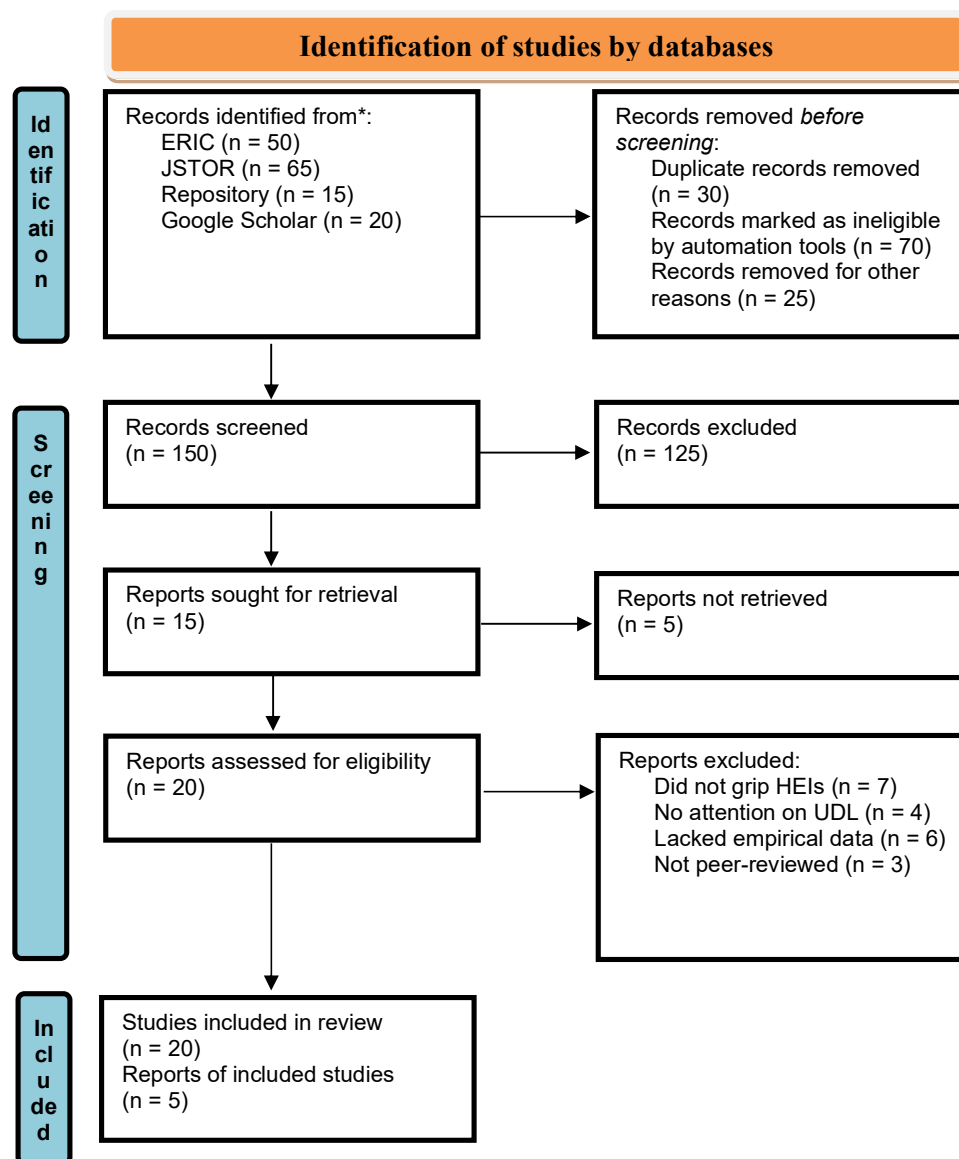| Included	
Studies included in review (n = 20) Reports of included studies (n = 5)	

Fig. 1.0: PRISMA Flow Diagram for of Relevant Literature

The study selection process involved initial screening and full-text review, conducted by two independent reviewers to enhance reliability and mitigate bias. Data extraction involved capturing study characteristics, findings, and contextual information. The methodological quality of each study will be critically appraised using established tools. Data synthesis was conducted through thematic analysis, categorizing enablers and disablers into key themes based on frequency and significance. Descriptive statistics and qualitative synthesis provided an overview of the identified enablers and disablers. This study involves synthesizing existing literature, as such it

does not require ethical approval. However, ethical guidelines were adhered to, ensuring proper citation and respectful presentation of findings. The study acknowledged limitations, including availability and methodological quality issues, and addressed these through rigorous selection criteria and transparent reporting.

RESULTS

The study revealed several key findings regarding the enablers and disablers of UDL implementation in Higher Education Institutions, particularly in the context of Zambia. The findings are categorized into enablers and disablers, with verbatim statements from the included studies to support each point.

Table 1: Summary of studies related to Universal Design for Learning in higher education institutions

Author (Year)	Prevalence	Findings	Sample Size	Country
Black, et. al. (2015)		UDL enhances accessibility	150	USA
Chanda (2021)	75	HEIs face challenges implementing UDL	200	Zambia
Davies, et. al. (2013)		Collaborative practices enhance UD	100	Australia
		Deep learning promotes UDL		
Fullan & Hargreaves (2016		Online courses improve UDL knowledge		
Gradel & Edson (2010)		Teacher training essential for UDL		Canada
Mutanga (2017)	80%	Policy frameworks hinder UDL implementation	50	USA
Phiri (2020)	60	UDL benefits diverse learners	120	Zambia
		Leadership crucial for UDL success		
Rao, et. al. (2014)				Zambia
		Training improves teacher attitudes toward UDL		
Scott, et. al. (2015)				USA
		Inclusive education faces challenges		
Sharma, et. al. (2019)	70	HEIs struggle with inclusive education	150	Australia
		Access to education limited		
Adera & Asimeng-Boahene (2011)		UDL effective in online courses		India
		UDL principles essential		
Banda (2021)		UDL theory and practice		
	40	UDL benefits diverse learners	100	Kenya
Chataika, et. al. (2012)	80	UDL effective in postsecondary education	200	Zambia
Dell et al. (2015)		HEIs struggle with inclusive education policies		Africa
Edyburn (2010)		UDL enhances accessibility		
Gordon, et. al. (2016)		UDL enhance accessibility	100	USA
Meyer, et. al. (2014)				
Morra & Reynolds (2010)		UDL facilitate inclusions		USA
				USA
Mwansa (2019)		UDL enhance accessibility		USA
		UDL facilitate flexibility		
Muzata, et. al. (2019)	60			USA
Zambia's Inclusive Education Policy (2019)		UDL engages students	120	USA
UNESCO's Convention on the Rights of Persons with Disabilities (2006)	75		150	Zambia
The Salamanca Statement (1994)	80		200	Zambia
Zambia's Education Act (2011)				Zambia
African Union's Continental Education Strategy for Africa (2016-2025)				New York
				Chicago
				Zambia
				Africa

Enablers of UDL Implementation

Institutional Support and Leadership

Strong institutional support emerged as a critical enabler of UDL adoption. One study stated, as one participant stated, "*When institutional leadership actively promotes inclusive practices, the integration of UDL becomes more feasible and effective*" (Muzata, 2019).

Professional Development Opportunities

Access to professional development and training for faculty was identified as a significant facilitator. As highlighted in a study, "*Ongoing training programs that equip educators with the knowledge and skills necessary to implement UDL principles are essential for successful integration*" (Mamun, 2024). This finding emphasizes the need for targeted professional development initiatives to enhance educators' competencies in UDL.

Availability of Technological Resources

The presence of appropriate technological tools and resources was noted as a key enabler. According to a study, "*The integration of assistive technologies into teaching practices significantly enhances the implementation of UDL, allowing for diverse learning modalities*" (Banker, 2023). This highlights the role of technology in supporting multiple means of representation and engagement.

Collaborative Approaches

Collaborative practices among educators and departments were seen as beneficial for UDL implementation. One participant noted, *"Collaboration among faculty across disciplines fosters a shared understanding of UDL and promotes innovative teaching strategies"* (Doblinge, Dowling & Helm 2016). This finding suggests that interdepartmental collaboration can lead to more comprehensive UDL practices.

Disablers of UDL Implementation

Lack of Awareness and Training

A significant barrier identified was the lack of awareness and understanding of UDL principles among faculty. One study reported that, "Many educators remain unfamiliar with UDL, leading to a reliance on traditional teaching methods that do not accommodate diverse learner needs" (Hutchins & Burker, 2020). This highlights the necessity for awareness-raising efforts to educate faculty about UDL.

Resource Constraints

Resource limitations, both financial and infrastructural, were major obstacles to UDL implementation. Chanda (2021) notes that "*Many HEIs in Zambia face severe budget constraints that hinder investment in necessary technologies and training for UDL*". This finding underscores the need for increased funding and resource allocation to support inclusive education initiatives.

Institutional Resistance to Change

Resistance to change within institutional cultures was another disabler. One respondent articulated, *"The entrenched practices in higher education often create a reluctance to adopt new pedagogical approaches, including UDL*" (Mamun, et. al., 2024). This indicates that cultural inertia can impede the adoption of innovative educational frameworks.

Inadequate Policy Implementation

Although policies promoting inclusive education exist, inadequate implementation was identified as a barrier. A study by Mulonda (2017) found that "*Policies support inclusive practices, yet the lack of effective implementation strategies at the institutional level limits their impact on UDL adoption*". This finding reveals the gap between policy formulation and practical application in higher education.

DISCUSSION

The findings of this study highlight enablers and disablers of Universal Design for Learning (UDL) implementation in Higher Education Institutions (HEIs) in Zambia. This discussion will elaborate on each finding in detail, incorporating relevant literature that underscores the complexities surrounding UDL adoption in the Zambian context.

Enabler 1: Strong Institutional Support and Leadership

The importance of strong institutional support and leadership in the implementation of UDL cannot be overstated. Effective leadership plays an essential role in promoting an inclusive educational environment and facilitating the adoption of innovative pedagogical frameworks such as UDL. As Hutchins & Burke (2020) articulate,

"When institutional leadership actively promotes inclusive practices, the integration of UDL becomes more feasible and effective." In Zambia, where the higher education system is marked by a history of traditional teaching practices, the presence of committed and informed leadership is essential. Leaders within Zambian HEIs must not only endorse UDL principles but also actively engage in the development of policies and practices that support inclusivity. This involves a commitment to professional development for faculty, where training programs are established to equip educators with the necessary knowledge and skills to implement UDL effectively. For instance, the leadership in institutions can establish UDL committees or task forces responsible for overseeing the integration of UDL principles into curricula and pedagogical strategies. These committees can provide guidance and resources to faculty, fostering an institutional culture that values diversity and inclusion.

According to Johnson and Muzata (2019), effective leadership in Zambian HEIs must recognize the importance of allocating resources to support UDL initiatives. This may involve budgeting for technological tools that facilitate diverse learning experiences, as well as funding for professional development workshops that empower educators to adopt inclusive teaching methods. Leaders should also advocate for the creation of a supportive institutional climate that encourages experimentation and innovation in teaching. This support can manifest in various forms, such as recognizing and rewarding faculty who successfully implement UDL principles in their classrooms. In addition to these strategies, it is crucial for institutional leaders to engage with the broader educational community to raise awareness about the importance of UDL. This may include partnerships with governmental agencies, non-governmental organizations, and other educational institutions to share best practices and resources related to UDL implementation. By actively promoting a collaborative approach to inclusive education, Zambian leaders can help to cultivate a national discourse around the necessity of UDL in higher education.

Ultimately, the presence of strong institutional support and leadership is indispensable for advancing UDL initiatives in Zambia. The commitment of institutional leaders to champion inclusivity not only sets the tone for faculty engagement but also signals to students the institution's dedication to meeting diverse learning needs. This foundational support is critical for ensuring that UDL principles are not merely theoretical concepts but are effectively integrated into the educational practices of Zambian HEIs.

Enabler 2: Availability of Professional Development Opportunities for Faculty
The availability of professional development opportunities for faculty materializes as another crucial enabler of UDL implementation. McKenzie, Karisa, Kahonde & Tesni (2021) underscore the importance of ongoing training programs that equip educators with the knowledge and skills necessary to implement UDL principles effectively. In the context of Zambia, where many educators may not have received formal training in inclusive teaching strategies, targeted professional development becomes essential. Effective professional development initiatives must be comprehensive and tailored to meet the specific needs of Zambian educators. This includes offering workshops and training sessions that focus not only on the theoretical underpinnings of UDL but also on practical applications that can be implemented in the classroom. For instance, educators could benefit from hands-on training in developing adaptable lesson plans, utilizing assistive technologies, and employing diverse instructional strategies that cater to various learning preferences.

Collaboration among faculty members during professional development programs is also critical. Research by Fullan and Hargreaves (2016) indicates that collaborative learning experiences foster a deeper understanding of new pedagogical approaches. In Zambian HEIs, creating opportunities for educators from different disciplines to come together for professional development can facilitate the sharing of ideas, resources, and best practices. Such collaborative efforts can enhance the overall effectiveness of UDL implementation and promote a culture of inclusivity within institutions. Furthermore, professional development should be ongoing and not limited to isolated workshops. As faculty members begin to implement UDL principles, they will require continuous support and opportunities for reflection and feedback. Institutions should consider establishing mentorship programs that pair experienced educators with those new to UDL. These mentoring relationships can provide valuable guidance and encouragement as faculty sail across the challenges of implementing inclusive practices.

As the matter of fact, in Zambia, educational resources may be limited; institutions should explore creative solutions to deliver professional development. Online training platforms and virtual workshops can expand access to high-quality professional development opportunities, particularly for educators in remote areas. This flexibility can empower more faculty members to engage with UDL training, thereby enhancing the overall capacity for inclusive education across the country. In prioritizing the availability of professional development opportunities for faculty, Zambian HEIs can significantly advance UDL implementation. Equipping educators with the necessary knowledge and skills not only empowers them to create inclusive learning environments but

also fosters a sense of ownership and commitment to the principles of UDL. In the long run, investment in professional development is a crucial step toward transforming educational practices and ensuring that all students have equitable access to quality education (Ministry of Education, Science, Vocational Training, and Early Education (MESVTEE), 2015).

Enabler 3: Integration of Appropriate Technological Resources

The integration of appropriate technological resources is another significant enabler of UDL implementation in higher education. The findings of this study support the assertion that "the integration of assistive technologies into teaching practices enhances the implementation of UDL" (Bankers, 2023). In Zambia, the potential for technology to facilitate diverse learning experiences is considerable, particularly as the country increasingly embraces digital innovation in education. Technological resources can provide educators with tools that enhance their ability to address the varying needs of students. For example, adaptive learning technologies and interactive multimedia resources can help educators' present information in multiple formats, thereby accommodating different learning preferences. Moreover, the use of learning management systems (LMS) can enable educators to create personalized learning pathways, allowing students to engage with course materials at their own pace. This flexibility is particularly important in Zambian, as learners may have differing levels of preparedness and varying access to educational resources.

Still, the successful integration of technology into UDL implementation is contingent upon the availability of adequate training and ongoing support for educators. Burgstahler (2015), emphasize that technology alone cannot ensure effective UDL implementation; educators must be equipped to leverage these tools thoughtfully and strategically. Therefore, Zambian HEIs must prioritize professional development that focuses on integrating technology into teaching practices in a manner that aligns with UDL principles. In addition to training, it is crucial to address the existing digital divide in Zambia. Notwithstanding the fact that urban institutions may have better access to technological resources, many rural HEIs struggle with inadequate infrastructure and limited connectivity. To bridge this gap, partnerships with technology providers and NGOs can be instrumental in providing access to affordable technology solutions. These partnerships can facilitate the development of low-cost tools and resources tailored to the specific needs of Zambian HEIs. Likewise, Zambian institutions should explore innovative approaches to technology integration, such as utilizing mobile learning platforms, which can enhance accessibility for students in remote areas. Mobile technology has the potential to provide students with access to educational materials and resources, thus supporting their learning journey in ways that traditional methods may not allow.

In the end, the integration of appropriate technological resources is essential for advancing UDL implementation in Zambian HEIs. By leveraging technology effectively, institutions can create inclusive learning environments that cater to the diverse needs of all students. This approach not only enhances the learning experience but also contributes to the overall goal of promoting equity and accessibility in higher education.

Enabler 4: Collaboration among Educators

Collaboration among educators is a crucial enabler of UDL implementation, as indicated by the findings of this study. The assertion that "collaboration among faculty across disciplines fosters a shared understanding of UDL and promotes innovative teaching strategies" Dabi & Golga (2024) highlights the importance of teamwork in addressing diverse learner needs. In Zambian HEIs, fostering a culture of collaboration can significantly enhance the effectiveness of UDL practices. Collaborative teaching approaches can provide faculty with opportunities to share resources, strategies, and experiences related to UDL. In Zambia, many educators may be working in isolation, creating formal structures for collaboration is essential. This can take the form of interdisciplinary teaching teams, where faculty from different disciplines come together to design and implement inclusive curricula. Such collaboration can lead to innovative teaching practices that better meet the needs of diverse learners.

Besides, collaborative efforts can extend beyond departmental boundaries. Establishing professional learning communities (PLCs) within Zambian HEIs can create a platform for educators to engage in reflective practice, share successes and challenges, and collectively explore solutions to common barriers in implementing UDL. Research shows that PLCs can enhance educators' capacity to implement new pedagogical approaches by fostering a supportive environment for continuous learning (Doblinger, Dowling & Helm 2016; Mpolomoka, 2018).

Disabler 1: Lack of Awareness and Understanding of UDL Principles

A major disabler identified in this study is the lack of awareness and understanding of UDL principles among faculty members. In line with this, Johnson and Muzata (2010) highlight that many educators remain unfamiliar with UDL, leading to a reliance on traditional teaching methods that do not accommodate diverse learner needs. In Zambia, many educators may have been trained in traditional pedagogical approaches; the transition to UDL may pose considerable challenges. To address this issue, it is imperative that Zambian HEIs prioritize awareness-raising initiatives aimed at educating faculty about UDL. This could include hosting workshops, seminars, and online courses that provide comprehensive information about UDL principles, their significance, and their practical application in the classroom. Moreover, engaging faculty members in discussions about the benefits of inclusive education can help to foster a greater understanding of the need for UDL in higher education.

Research by Naeem et al (2024) suggests that awareness campaigns and professional development opportunities can effectively enhance faculty knowledge and skills related to UDL. HEIs institutions should consider leveraging existing networks and partnerships to disseminate information about UDL more widely. Through involving key stakeholders, including educational leaders, policymakers, and practitioners, institutions can cultivate a collective understanding of the importance of inclusive education and the role of UDL in achieving it. Furthermore, institutions should consider utilizing successful case studies of UDL implementation in similar contexts to illustrate the potential benefits and feasibility of adopting inclusive practices. Highlighting success stories can serve to inspire and motivate educators to embrace UDL, demonstrating that it is not only achievable but also beneficial for student learning and engagement.

Disabler 2: Resource Constraints

Resource constraints represent a formidable barrier to UDL implementation in Zambian HEIs. The assertion that "many HEIs in Zambia face severe budget constraints that hinder investment in necessary technologies and training for UDL" (Chanda, 2021) highlights the systemic challenges faced by institutions striving for inclusivity. Financial limitations can stifle innovation and hinder the implementation of effective UDL practices, ultimately impacting the quality of education provided to students. In many Zambian institutions, inadequate funding can result in a lack of access to essential technological tools and resources that facilitate UDL. As highlighted by Fullan (2017), "without the necessary resources, institutions may struggle to implement pedagogical innovations that are critical for addressing diverse learner needs." To overcome this barrier, it is essential for stakeholders at all levels to advocate for increased funding and investment in inclusive education. This includes making a compelling case to government agencies, private sector partners, and international organizations about the importance of supporting UDL initiatives in higher education.

On the other hand, Zambian institutions must explore creative solutions to optimize existing resources and improve efficiency. This may involve collaborating with other institutions to share resources, knowledge, and best practices. For instance, institutions could establish consortia to collectively purchase technological tools or develop shared training programs for faculty. Such collaborative approaches can help mitigate resource constraints and create a more sustainable environment for UDL implementation. Leveraging partnerships with local and international NGOs can provide additional support for UDL initiatives. Many organizations have a vested interest in promoting inclusive education and may offer funding, resources, or expertise to assist Zambian HEIs in their efforts to implement UDL effectively. Through actively seeking out these partnerships, institutions can expand their capacity to address diverse learner needs.

Disabler 3: Institutional Resistance to Change

Institutional resistance to change is another significant disabler that impedes the implementation of UDL in Africa, and Zambian HEIs respectively. This corroborates with what Gresham (2016) posits that the entrenched practices in higher education often create a reluctance to adopt new pedagogical approaches, including UDL. This resistance is often rooted in a deep-seated adherence to traditional educational practices, which can inhibit the adoption of innovative pedagogical frameworks like UDL. To raise to the occasion, institutional leaders must actively advocate for UDL and work to create a culture that embraces innovation and change. This may involve initiating open dialogues about the benefits of UDL, highlighting its positive impacts on student learning and engagement. Moreover, showcasing successful UDL initiatives within the institution can demonstrate the viability and effectiveness of inclusive practices, helping to alleviate concerns and encourage buy-in from faculty.

The process of change management is critical in overcoming institutional resistance. Kotter (1996) outlines an eight-step process for leading organizational change, emphasizing the importance of creating a sense of urgency, forming a guiding coalition, and communicating the vision for change. In many African countries, HEIs leaders must mobilize support among faculty and stakeholders to foster a shared commitment to UDL implementation.

Furthermore, providing ongoing support and resources to faculty during the transition to UDL can mitigate resistance. Professional development programs should not only focus on the theoretical aspects of UDL but also address the practical challenges that educators may encounter as they implement new strategies. Thus, offering continuous guidance and mentorship, institutions can help faculty navigate the complexities of UDL adoption and build their confidence in using inclusive practices (Mpolomoka, et. al., 2018; Mpolomoka & Sakai, 2021; Mushibwe, et. al., 2020; Mercé, et. al., 2024; Summer, 2025).

Disabler 4: Inadequate Policy Implementation
Inadequate policy implementation presents a considerable barrier to UDL adoption in particularly Zambian HEIs. Suffice to say, this seems to be a trend across Africa. Literature advances that although policies support inclusive practices, the lack of effective implementation strategies at the institutional level limits their impact on UDL adoption (Machado, 2023; Chirwa, et. al., 2024; Echeles, et. al., 2025; Nawire, et. al., 2025). This finding reveals a critical gap between policy formulation and practical application. Although there are policies advocating for inclusive education, the absence of robust implementation frameworks often results in ineffective practices. Therefore, institutions must develop comprehensive implementation plans that translate policy into actionable strategies. This includes establishing clear guidelines for UDL implementation, setting measurable goals, and creating accountability mechanisms to assess progress. By outlining specific steps and expectations, institutions can ensure that UDL principles are effectively integrated into teaching practices.

Moreover, according to Gresham, Robichaux & York (2012), engaging faculty in the policy implementation process can foster a sense of ownership and commitment to inclusive practices. Faculty members who are involved in the development of implementation plans are more likely to be invested in the success of UDL initiatives. Collaborative efforts to create implementation strategies can lead to a more cohesive understanding of UDL principles among faculty, eventually resulting in more effective application in the classroom. In like manner, regular monitoring and evaluation of UDL implementation efforts are essential to ensure that policies are being effectively enacted. Institutions should establish mechanisms for assessing the impact of UDL practices on student learning outcomes and engagement. By collecting data and feedback from students and faculty, institutions can identify areas for improvement and make necessary adjustments to their implementation strategies. This advocacy corroborates with what literature depicts in other fields of study, for example, Mainde, et. al. (2022) portray this in their advocacy for 'Adapting Fadel's Four-Dimensional Education Model in Teaching and Learning Civic Education In 21st Century Zambia'. We see a scenario in what is advocated for by Banda, et. al. (2023) in their study on the application of Bloom's Taxonomy in Categorization of Cognitive Process Development in Colleges; and partly, findings of the study by Sikanyika, et. al. (2022) establishes a formidable basis, though at a secondary set up, on which Inclusive Education for both Children with and without Disabilities can leverage adjustments to the implementation strategies for teaching UDL

Conclusion
In conclusion, this meta-analysis provides a comprehensive understanding of the factors influencing the implementation of UDL in HEIs. The findings offer valuable guidance for educators, policymakers, and stakeholders seeking to promote inclusivity and accessibility in higher education. Key findings from the study include the importance of committed institutional leadership, aligned national education policies, and focused capacity-building initiatives for educators in facilitating UDL implementation. However, significant disablers such as insufficient resources, inadequate infrastructure, and limited faculty expertise in UDL principles continue to hinder its adoption. The study also highlights the systemic issues such as poverty, lack of access to technology, and cultural barriers that can impede the effective implementation of UDL. Addressing these challenges is crucial for creating a more equitable and inclusive learning environment for all students. The study underscores the need for a holistic approach to UDL implementation, considering not only the pedagogical aspects but also the broader social and cultural context. Hence, recognizing and addressing the interconnectedness of these factors, the HEIs can create a more inclusive and supportive learning environment for all students.

Recommendations
1. The government should ensure that national education policies are fully aligned with inclusive practices, including UDL principles.
2. Provision of adequate resources, infrastructure, and support to HEIs to enable effective UDL implementation should be adhered to.
3. There is need to invest in ongoing professional development programs to enhance faculty expertise in UDL principles and practices.
4. The Ministry of Education should allocate sufficient resources to support UDL initiatives, including technology, instructional materials, and accessibility services.

5. The central government should ensure that HEIs have the necessary infrastructure and accessibility features to accommodate diverse learners.

6. Above all, it might be positive to foster collaboration between HEIs, government agencies, and non-governmental organizations to address systemic challenges and promote UDL implementation.

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