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Review

Barriers and Facilitators to Inclusive Education for Learners Who Are Deafblind: A Scoping Review

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Abstract: The case of Hellen Keller presents a great example of what a learner who is deafblind can achieve if provided with the appropriate educational accommodation in terms of content, environment, learning approach, instructional strategies, and teaching methodologies. However, access to education is not the reality for most learners who are deafblind due to their unique educational needs, owing to their dual sensory impairment. There has been an assertion that learners who are deafblind may not thrive in inclusive educational spaces, but there is a paucity of research to support or dispute this assertion. This scoping review explored what is documented in the literature on the barriers and facilitators to inclusive education for learners who are deafblind. A scoping review methodology using Arksey and O'Malley's framework was employed. A search was conducted using six databases, including Science Direct, PubMed, Scopus Medline, ProQuest and gray literature, to identify publications focusing on the barriers and facilitators to inclusive education for learners who are deafblind. The findings from the scoping review suggest that the factors that influence the inclusion of learners who are deafblind in inclusive educational settings include the availability of educational settings; accessibility to the physical and social environment, and assistive devices; acceptability by peers and educators and the preparedness of educators; and the adaptability of classroom strategies. For learners who are deafblind to thrive in inclusive educational settings, transformational attitudes and intentional and specific strategies from multiple stakeholders are necessary. Therefore, the educational system, schools, peers and communities should be deliberate in putting in place specialized support and resources to accommodate the diverse needs of learners who are deafblind in all phases of their schooling life.

Keywords: inclusive education; learners who are deafblind; access to education

Citation: Masuku, K.P.; Khumalo, G.; Moroe, N. Barriers and Facilitators to Inclusive Education for Learners Who Are Deafblind: A Scoping Review. *Educ. Sci.* **2024**, *14*, 1072. https://doi.org/10.3390/educsci14101072

Academic Editor: Eleni Andreou

Received: 31 August 2024
Revised: 23 September 2024
Accepted: 27 September 2024
Published: 30 September 2024



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1. Introduction

Education is the right of every child, regardless of whether they present with a disability or not. The right to education for every child emanates from international frameworks and treaties such as the Nations Convention on the Rights of Persons with Disabilities (CRPD), specifically Article 24 of the convention [1] and article 23 of the Convention on the Rights of the Child [2]. Sustainable Developmental Goal number 4 [3] also mandates signatory states to promote equal opportunities to all learners, including learners with disabilities. Globally, the vast majority of states have ratified these international rights law instruments, thereby committing to the legally binding frameworks and implementing measures to ensure that children with disabilities have access to education. The above-mentioned international treaties, including the concluding remarks of the Salamanca statement [4], advocate for a push towards the development and implementation of inclusive education systems [5] as a means of addressing the historic exclusion of children with disabilities from education systems.

Inclusive education is defined by Bornman [6] (p. 23) as "a system in which all learners are accepted and fully integrated both academically and socially". It is a system that accepts and fully integrates all learners and guarantees an opportunity for each learner by "opening and providing access to the regular schooling system, regardless of their individual characteristics" [7] (p. 2) Differentiated and individualized teaching and learning are therefore key to the success of inclusive education [7]. The United Nations Educational Scientific and Cultural Organisation (UNESCO) [8] further submits that inclusive education should consider the needs of the previously underprivileged, specifically those who live in rural communities, those who are from ethnic and linguistic minorities, those affected by HIV/AIDS, those affected by hunger and poor health, and those with disabilities or special needs. Essentially, inclusive education is synonymous with human rights and social justice [9].

Despite an overwhelming number of states sanctioning and endorsing these legal frameworks and further developing policies as a means of implementing inclusive education, universally, children with disabilities continue to struggle to access education in comparison to their counterparts without disabilities, especially in developing countries with limited resources [10]. The United Nations Children's Emergency Fund (UNICEF) approximated that in 2014, in developing countries alone, about 90% of children with disabilities had at no occasion attended formal schooling. In both developed and developing countries, the schooling system is still divided into mainstream schools, inclusive education schools (also known as full-service schools), and special needs education schools. [11,12]. Mainstream schools are defined as schools that cater for learners without disabilities but may have classes that cater for learners requiring additional learning support. Inclusive education schools, sometimes referred to as full service schools, are mainstream schools which are especially resourced and orientated to address a full range of barriers to learning in an inclusive education setting, while special needs education schools are schools that are equipped to deliver a specialized education program to learners requiring access to high intensive educational and other support on a full-time or part-time basis [13]. The very concept of inclusive education seems to have different definitions, understandings and implementation strategies [11]. Factors that pose a challenge to the realization of the right to education for children with disabilities in developing countries, can be classified into socio-cultural, economical, policy-related and school-related factors [10]. Dogbe and Anku [14] identified negative attitudes from peers, teachers, parents, communities and religious communities as socio-cultural factors that influence access to education for learners with disabilities. Contextual and cultural influences that affect access to education for children with disabilities have been said to emanate from stigma and discrimination [14]. Economic factors, on the other hand, have been said to be high school and transportation fees, especially for underprivileged and poor households [14]. Furthermore, policy- and school-related factors, such as the red tape around admissions of children with disabilities in schools, ambiguous policies, and the poor implementation of policies, especially those related to inclusive education, a lack of resources, a below-par curriculum, and a lack of educator training and support, have been highlighted as barriers to achieving inclusive education [11].

Even though access to education for children with disabilities generally present as a challenge, barriers to accessing education are intensified in children who are deafblind. "Access" to education in this study is conceptualized using Ramaahlo et al.'s [15] access to education framework, which, even though was tailored for inclusive education in higher education, is still applicable to education across the lifespan. Ramaahlo et al.'s [15] framework combines the four tenets of inclusive education from Tomaševski's [16] 4A framework and Maxwell and Granlund's [17] tenet of affordability. Ramaahlo et al. [15], therefore, submit that for education to be accessible, it should be as follows: (i) *Available*—there should be sufficient educational facilities and programs for learners with disabilities; (ii) *Accessible*—educational facilities should remove barriers that hinder the learners with disabilities from applying and being admitted into educational facilities; (iii) *Accepting*—

educational spaces should be accepting and recognize children with disabilities as part and parcel of the schooling community; (iv) *Adaptable*—educational facilities should implement the Universal Design Learning Principles to accommodate learners with disabilities; and (v) *Affordability*—education should be financially accessible to learners with disabilities.

Deafblindness, on the other hand, is defined by Moroe and Masuku [18] as an acquired or congenital distinct dual or multisensory impairment marked by various extents of hearing and visual impairment. For the purpose of this paper, deafblindness is defined using Wolford's [19] definition of deafblindness, where they say that deafblindness is a combined vision and hearing loss, causing such severe communication and other developmental and educational needs that the student cannot be accommodated for in special education programs solely for students who are deaf, or students who are blind, or in special education programs solely for students multiple disabilities. It is a low-prevalence impairment, with its prevalence estimated to be between 0.2 and 2% globally [20]. The simultaneous visual and hearing impairment restricts access to information necessary for the development of language, communication, cognition, and socio-emotional and mobility skills and abilities [21], all of which are skills paramount to social participation and education, as it is well documented that learning occurs through vision and the hearing senses [22]. For example, the dual sensory nature of the impairment results in such grave communication, developmental, and educational needs that children who are deafblind cannot be placed at schools designed exclusively for children who are only deaf or children who are only blind [19]. Learners who are deafblind have a vast and a multiplex cluster of demands, which may challenge the skills and resources of the mainstream schooling system [23]. It can thus be an anticipated and acceptable fact that, for children who are deafblind to succeed in accessing the curriculum and participating fully in natural educational spaces, a collaborative approach from various professionals who are knowledgeable and skilled in deafblindness is therefore required [18,23].

While it is an undisputed fact that learners who are deafblind require significant support from highly knowledgeable and skilled professionals, most educators who are involved in teaching learners who are deafblind have not had much experience with deafblindness [22,24]. Another conundrum is that, similarly, professions who are experts in communication disorders and mobility, such as speech language therapists (SLTs), audiologists (A), occupational therapists (OTs) and physiotherapists (PTs), who are also required to successfully support educators and learners who are deafblind to succeed in the academic program, are not necessarily always empowered in terms of skills and knowledge on deafblindness. For example, Charles [25]; Maguvhe [24]; and Manga and Masuku [22] presented that often, educators have very limited knowledge and experience with deafblindness. Equally so, therapists who are expected to support educators in supporting learners who are deafblind, through facilitating the development of quality educational programs in the schooling system that create appropriate communication and learning opportunities, also have limited competence and confidence in their abilities of diagnosing and treating children who are deafblind [26], which has implications for early intervention for this population, especially in terms of appropriate school placements [27]. Moroe et al. [26] attributes the lack of confidence and competence in identification, assessing, and treating learners who are deafblind to deafblindness not necessarily forming part of the clinical training of most rehabilitation healthcare professionals. Dogbe and Anku [14], in a study that was conducted in Uganda, confirmed Moroe et al.'s [26] findings by submitting that the stakeholders involved in the education of learners who are deafblind (parents, educators, speech language therapists and audiologists) lacked knowledge and understanding about deafblindness, especially facilitating communication with learners who are deafblind; they were also inadequately prepared for supporting learners who are deafblind in the education system, and furthermore, they lacked the necessary resources.

Available literature on deafblindness has mostly focused on the early identification and management of children who are deafblind [26,28,29] and the communication barriers between learners who are deafblind and their teachers and families. Where studies have documented educational experiences, these studies have mainly focused on the training needs of educators and the curriculum of learners who are deafblind [22,25,30,31], and how technology can be used to foster participation in communication [30]. There are a number of studies that have looked at inclusive education for learners with different disorders, for example, children with autism [32,33] who are deaf [34–36] and learners who are blind [37,38]; however, there has been a paucity of research on inclusive education for learners who are deafblind. The available literature currently paints a very bleak picture as far as education for learners who are deafblind is concerned, especially in developing countries [14,22,24,25], with even a suggestion that due to the complexity of the dual sensory impairment, learners who are deafblind have a better chance of succeeding in special schools tailor-made for them [18,19].

However, the case of Hellen Keller provides a ray of hope. It is a remarkable story and a testament that learners who are deafblind are indeed educatable. It also puts into perspective what learners who are deafblind can achieve if provided with the right support [39]. It took a skilled, progressive and inspired teacher who believed in the abilities of a learner who presented with a profound and complex communication disorder and provided them with the necessary communication and instructional strategies for Helen to be educated, despite not being received well by her community because of her disability. The authors of this paper are therefore arguing that even though there is an assertion that learners who are deafblind may not thrive in inclusive educational settings because of the complexities of their disorder, there has not been adequate research presented to support or dispute this notion, hence this scoping review. From the case of Helen, it is clear that a learner who is deafblind can access the curriculum successfully if provided with the appropriate educational accommodations, specifically regarding content, environment, learning approach, instructional strategies, and teaching methodologies. Educational accommodation forms part of the core pillars of inclusive education. It therefore behooves the researchers to explore what is documented in the literature on the barriers and facilitators to inclusive education of learners who are deafblind, to highlight the state of inclusive education for these learners and to also indicate the available and needed accommodations to facilitate inclusive education for them, if indeed inclusive education is ideal for leaners who are deafblind.

2. Study Design

This scoping review employed the established framework developed by Arksey and O'Malley [40]. This methodological approach was strategically chosen due to its inherent strengths in comprehensively mapping the existing literature, as well as in identifying knowledge gaps within a specific field [41]. These characteristics of a scoping review were particularly valuable in our study, where a thorough exploration of the existing research is essential to highlight areas that require further investigation regarding barriers and facilitators to inclusive education for deafblind learners. The review process meticulously adhered to the five key phases outlined by Arksey and O'Malley [40], namely (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results. Notably, the research team comprised three academic researchers: KM, GK, and NM. KM conducts research in the fields of disability, deafblindness and inclusive education, GK conducts research in the area of education and NM lectures and conducts research in the area of deafblindness.

2.1. Research Question

A clearly defined research question guided this review: "What is documented in the literature on the barriers and facilitators of inclusive education for learners who are deafblind?" This focused question, collaboratively agreed upon by the researchers and prompted by Levac, Colquhoun, and O'Brien [42], served as the cornerstone of the investigation.

2.2. Data Sources and Search Strategy

The initial search was conducted by the researchers in November 2023, and a follow-up search was carried out in May 2024. The following six databases were accessed through the University of the Witwatersrand library: Scopus, PsychInfo, Education Resource Information Center (Eric), ScienceDirect, ProQuest, and Web of Science. The selected databases were recognized for their comprehensiveness and ability to cover a broad range of disciplines. Search terms, meticulously developed by the researchers based on the formulated research question and the PICo framework, were consistently applied across all databases: ("deafblind" OR "deaf-blind" OR "deafblindness") AND ("student" OR "pupil" OR "learner") AND ("barriers" OR "facilitators") AND ("inclusive education"). In addition, to enhance the search processes, we supplemented database searches with a 'hand search'. A hand search is a process of finding articles that were not found through the traditional searches of the review. This was carried out by checking references in the already included full-text publications and through Google Scholar. Publications were deemed eligible for this study if they broadly contained the search terms and offered insights into barriers and facilitators within the realm of inclusive education for the learners who are part of the deafblind population. A detailed breakdown of the search strategy employed in this review is presented in Table 1.

Table 1. Inclusion and exclusion criteria.

Criteria Category	Inclusion Criteria	Exclusion Criteria
Targeted population	Included publication on learners who are deafblind.	Excluded publications on learners who do not have a combination of visual and hearing loss (i.e., blind-only and deaf-only learners).
Study context	Included publications on inclusive education.	Excluded publications that are not focused on inclusive education.
Type of publications	Included publications that are peer-reviewed, with the full text accessible through the database.	Excluded publications that are not peer-reviewed and with no full text.
Language	Included articles published in the English language.	Excluded articles published in other languages, and not available in the English language.

2.3. Citation Management and Screening

This scoping review leveraged Rayyan, a web-based systematic review software known for its user-friendly interface and semi-automated screening capabilities [43]. All citations retrieved from the databases were imported into Rayyan, facilitating an efficient screening at the title-, abstract-, and full-text level. The software automatically identified duplicates, which were further confirmed and removed by KM. The screening procedure commenced with an initial screening of citation titles to determine relevance. Subsequently, abstract screening was undertaken for citations meeting the inclusion criteria established at the title level. Articles deemed suitable following abstract screening proceeded to full-text screening. The different stages of screening were conducted independently by KM and GK. In cases where conflicts or discrepancies arose during this process, NM conducted a comprehensive review to resolve and reach a final decision. This meticulous screening protocol was implemented to ensure the systematic and rigorous

selection of citations for inclusion in the study. Additionally, the protocol ensured a high level of accuracy and eliminated potential bias during the selection process.

A total of 7153 publications were identified across the selected databases. After deduplication by Rayyan and manual confirmation by KM, 4925 records remained for title screening. This initial stage excluded 4861 records, leaving 64 citations for abstract screening. Following a detailed review of abstracts, 58 articles advanced to full-text analysis. A total of 51 articles were removed due to reasons related to them not reporting on barriers and facilitators of inclusive education for deafblind learners and one for not being published in English. The researchers identified only seven as requiring consideration for full inclusion in this scoping review. Following discussions about those articles, the researchers decided to include three. Ultimately, the other two were excluded due to the following particulars as per each article: (1) the study population involved visually impaired students, but the authors argued that the findings would apply to deafblind students; (2) the study was conducted in a mainstream school, not in a fully inclusive education setting; (3) the full text was not available; (4) the article was not in English. A hand-search strategy was then employed to search some of the already included full-text articles for publications reflecting barriers and facilitators to the inclusive education of learners who are deafblind. The hand search was also conducted through Google Scholar, and five articles were identified and met the inclusion criteria. Ultimately, eight articles were identified to meet the inclusion criteria and were incorporated into this scoping review. Figure 1, adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, visually depicts the search strategy and article selection process.

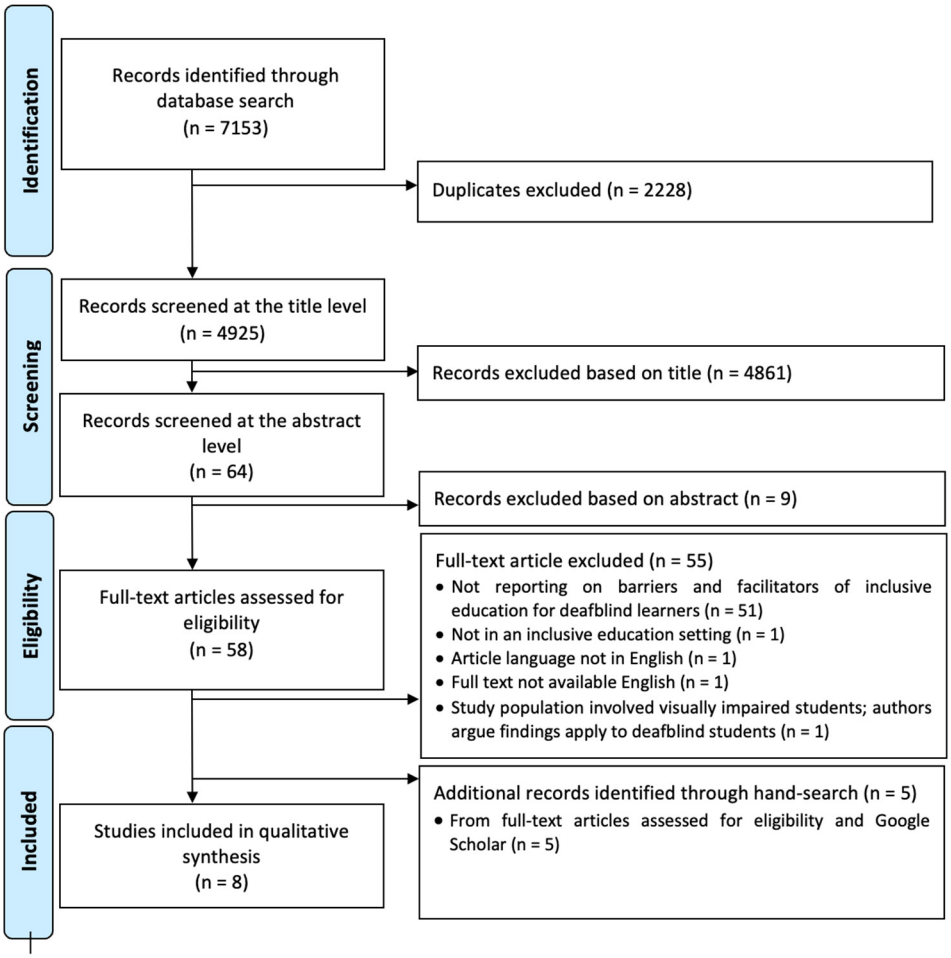


Figure 1. Flow chart of the study selection process.

2.4. Data Charting

Following the independent review of the eight final articles, the researchers convened to discuss and confirm their relevance for inclusion in the scoping review. This collaborative approach ensured a high level of inter-rater reliability. Subsequently, a comprehensive data charting exercise was undertaken. Using Microsoft Excel 2016, the researchers developed a standardized spreadsheet to systematically capture key characteristics from each included publication. These characteristics encompassed publication information (author, year, and country of publication), methods (research aims and study design), participant demographics (population, sample size, and learner age range), and reported results. Table 2 presents this data chart in its entirety. Once data extraction was complete, a thematic analysis was conducted using the inductive approach outlined by Braun and Clarke [44]. This approach allowed for the emergence of themes directly from the data itself, providing a rich and nuanced comprehension of the facilitators and barriers to inclusive education for deafblind learners.

2.5. Ethical Considerations

As this scoping review exclusively analyzed publicly available articles, formal ethical approval was not required. This is because the research did not involve any primary data collection or any interaction with human or animal subjects. However, the review adhered to all relevant ethical principles for conducting research without direct participant involvement.

Table 2. Studies included in the scoping review.

Author/s and Country	Title of Publication	Aim/s and Methods	Population	Results	Conclusions/Recommendations	Key Observation
Sichari, Bota, and Okaya. (2020). [45] Kenya	Inclusive Education in Kenya: Within School and in Life Cycle Transitions.	To establish the impact of the inclusion of persons with disabilities in mainstream society in Kenya in terms of employment and entrepreneurship. Qualitative; case Study.	Three participants (a person who is blind; a person who is deaf; and a person who is deafblind)	Availability • The parents opted to take him to a local vocational training center, where he qualified as a masonry artisan Accessibility • It is important to provide appropriate guidance and counseling for persons with special needs on careers that suit their disabilities • Studied in public primary inclusive schools up to grade 8 • Late diagnosis of deafblindness (Grade 5) Adaptability • He uses spectacle lenses and hearing aids to enhance his communication abilities	There is a strong positive connection between inclusion practices and the development and contributions of individuals with disabilities within a community. Comparative studies are needed to assess the outcomes of individuals with special needs who attended specialized institutions versus those who are in inclusive education programs.	Inclusive education in Kenya empowers individuals who are deafblind, leading to economic independence and self-sufficiency. They emphasized the crucial link between inclusive practices and the development and contributions of individuals with disabilities within their communities.

Chanock, K. (2010). [46] Australia.	Enhancing Student Success: Meeting the Unique Needs of University Students with Deafblindness.	Documents the challenges that university students who are deafblind face, where strategies meant for deaf or blind students do not necessarily work. Methods not mentioned.	One person who is deafblind attending university	Acceptability • Ensuring that students include Elizabeth in classroom discussions. Adaptability • Finding ways to respond meaningfully to writing Acceptability • Ensuring that students include Elizabeth in classroom discussions. Technical support in the classroom Adaptability • Finding ways to respond meaningfully to writing • Non-technical support (i.e., accommodation for assignment and written work, students identifying themselves while speaking, sent lectures to lecturers ahead of time, dialogical learning, taking notes, number and format of assignments) • Technical support in the classroom (i.e., reading in accessible formats, note-takers providing a record of lectures and tutorials, interpreting services, and reading preferences, from large print to braille).	For students with limited vision, using a system of written feedback on drafts that is simple, clear, consistent, and easily recognizable is beneficial. Although methods used in this study were developed for students who are deafblind, they can also be effectively applied to students with a single sensory impairment, as needed.	Including deafblind learners demands extensive preparation—financially, academically, socially, and, most importantly, through the dedication of time and commitment from all stakeholders. Inclusive education is, first and foremost, a shared responsibility. Additionally, university education serves as a public good. Therefore, it is essential for everyone to contribute significant effort toward progress,

						ensuring the necessary support for the education of all students, especially those who are deafblind.
Romer and Haring (1994)[47] USA	The Social Participation of Students with Deafblindness in Educational Settings	To examine the patterns of contact among non-disabled ag	Students participating included a range of ages from 4 years to 17 years	Acceptability Poor acceptability by peers Accessibility Access to assistive devices and technologies	Schools should include students with deafblindness alongside their peers. However, attention should be given not only to the amount of time these students spend with their peers but also to the stability and quality of their interactions. To achieve effective inclusion, schools should focus on fostering meaningful and consistent connections between students with deafblindness and their peers.	Inclusion is not an outcome but a process variable. While it is a valued and important aspect of education, it serves as a means to achieve other meaningful outcomes.
Dogbe and Anku (2024) [14] Ghana.	Prospects and challenges of educating a deafblind student	To document the challenges and prospects of educating a deafblind student	Fourteen participants (students who are deafblind;	Accessibility • Ill-preparedness of lecturers • Lack of teacher and lecturer training on deafblindness	Communication is key to the relationship between deafblind learners and educators. With appropriate support, such as specialized	Inclusive education demands extensive preparation—financially, academically,

	in a university in Ghana.	in a public university in Uganda. Qualitative, exploratory.	lecturers of persons who are deafblind)	• Time-consuming nature of teaching deafblind learners • Carrying a braille machine, which is heavy Acceptability • Communication difficulties Lack of skills to facilitate communication Lack of time commitment Acceptability • Accommodation for parents and sign language interpreters • Accepted by peers in class	training in deafblindness, effective communication strategies, and skill development, learners can succeed. A collaborative approach involving educators, therapists, and families can enhance support for both the educator and the deafblind learner, leading to positive outcomes	socially, and, most importantly, through the dedication of time and commitment from all stakeholders. Inclusive education is, first and foremost, a shared responsibility. Additionally, university education serves as a public good. Therefore, it is essential for everyone to contribute significant effort toward progress, ensuring the necessary support for the education of all students, especially those who are deafblind.

Correa-Torres, (2008). [48] USA.	Communication Opportunities for Students with Deafblindness in Specialized and Inclusive Settings: A Pilot Study.	To explore the nature of social experiences and opportunities for communication amongst students who are deafblind, their sighted peers with no hearing loss, and adults in inclusive education settings. Qualitative case study.	Three students who are deafblind	**Acceptability** • Use of helpers sometimes perceived as helpless • Lack of training **Acceptability** • Not knowing what to do with students who are deafblind in a classroom situation. • Conversations with fellow students without disability about disability and learning styles • Model communication strategies to students without disabilities with students who are deafblind. • Educators and paraprofessionals had a positive attitude towards inclusion. • Use of more than one paraprofessional In-service training • Collaboration between team members. Use buddies or helpers to promote social interactions Adaptability • Adapted assessments • Same schedule • The use of inclusion facilitators	While this study offers valuable insights into the communication opportunities for students with deafblindness across various educational settings, its limitations must be acknowledged. To strengthen future research, it is recommended to expand the number of educational sites and sample size, perform multiple observations for each student, and increase the duration of each observation to improve the generalizability of the findings.	Inclusion practices varied across three schools, with only one truly integrating students by using an inclusion facilitator who supported both students and staff. The real issue in special education is not the amount of training but its focus. Instead of preparing teachers to manage separate special education classes, training should equip them to collaborate with general education staff to support

				• Use buddies or helpers to promote social interactions.		inclusive education.
Sall and Mar (1999). [49] USA.	In the Community of a Classroom: Inclusive Education of a Student with Deafblindness.	To describe the inclusive program of a student who is deafblind. Qualitative case study	One student who is deafblind	Accessibility • Administrators interested in having learners with disabilities in their schools • Assistant teacher assigned Acceptability • Involvement of head teacher • Administrators interested in having learners with disabilities in their schools • Assistant provides direct support and collaborates with other service providers • Physical environment • Orientation and mobility instruction	When evaluating inclusive education programs, it is important to analyze various critical factors beyond teaching methods and resources. Successful inclusive education programs for students who are deafblind are likely to address broader community aspects in addition to instructional support.	Everyone involved with Mitch saw themselves as integral to the school community, emphasizing a collective responsibility for success. Full inclusion for students with disabilities, including those with deafblindness, requires not only

				Peer involvement Student's respect Adaptability • Adapted lessons and materials • Adapted and accommodative educational program Braille and computers Translated textbooks and other materials into braille • Assisted technology and adapted material Braille and computers • Assistant provides direct support and collaborates with other service providers. • Physical environment • Specialized instruction • Speech therapy sessions • Assistant teacher assigned • Orientation and mobility instruction		proper academic and social supports but also a focus on how schools function as community systems. This includes administrative systems, peer networks, and the perceptions, attitudes, and beliefs of the school staff.
Wakuru,Kisanga &Vuzo (2022).[50]	Primary School Teachers' Pedagogical Practices and Inclusive Education: A	To present evidence on primary school teacher's pedagogical practices in the	Fourty participants—Eight special and eight regular	Adaptability • One-size-fits-all lesson plans • Lack of pedagogical practices that are inclusive	Teachers lack the pedagogical knowledge and skills needed to adapt assessments for diverse needs. The assessment process is frequently focused	The absence of appropriate assessment strategies for students with moderate

Tanzania	Case of Pupils with Moderate Deafblindness in Tanzania	inclusion of pupils with moderate deafblindness A qualitative study with multiple case study design	education teachers, four heads of schools and four academic teachers; eight pupils with moderate deafblindness and eight non-disability pupils	• Furthermore, the environment and classroom modification	on examination results rather than evaluating students' competencies. Pupils with deafblindness require performance-based assessments that utilize multiple tools to address their specific needs.	deafblindness, combined with uniform lesson plans and inadequate teaching materials, leads to their exclusion and undermines the principles of inclusive education.

Ingraham, Daugherty, and Gorrafa (1995). [51] USA	The Success of Three Gifted Deafblind Students in Inclusive Educational Programs	To examine the challenges and successes of three academically gifted students in inclusive educational programs over four years and present recommendations for teachers and parents who are contemplating the placement of students with similar needs in inclusive programs.	Three learners who are deafblind Quantitative	Adaptability • Both the classroom and the environment were adapted for the learner Accessibility • Had access to technology and assistive devices Acceptability • Limited socialization with peers; however, excellent academic performance.	Each student must be considered individually, with careful attention given to the impact of their placement. The potential for isolation and strategies to address this concern should be thoroughly evaluated before making placement decisions. In the cases discussed, students benefited from a strong foundation provided by a segregated program. While such support does not have to be delivered in a segregated setting, the student's comprehensive needs must be fully addressed during the development of the Individualized Education Plan (IEP).	It is recommended that inclusive programs, especially those not accustomed to accommodating deafblind students, initiate regular meetings to discuss and plan the specific services and support these students need. This proactive approach will ensure that the educational programs are appropriately tailored to meet the unique needs of advanced-level deafblind students.

3. Results

This scoping review aimed to document the barriers and facilitators to inclusive education of learners who are deafblind. A total of eight studies were included in the final analysis. Five of the studies originated from high-income countries (four from the United States of America and one from Australia) and the remaining three from low- and middle-income countries, specifically Ghana, Tanzania and Kenya (see Table 2). Seven studies were qualitative in nature and employed observations as well as interviews, while one study was quantitative. Five were conducted with learners in primary school and the remaining three were with students in tertiary education. The sample size of all the studies was small and ranged between 1 and 13 participants, including students who are deafblind, their teachers/lecturers, and in one study, their parents. All the studies focused on inclusive education. Three of the included papers, Sichari, Bota [45], Correa-Torres [48], and Romer and Haring [47], met the inclusion criteria for this review but will not be discussed in detail. While all three mention barriers and/or facilitators to inclusive education, Sichari, Bota [45] focused on correlating inclusive education to employment. This study compared three students with deafness, blindness, and deafblindness, respectively, who were taught in an inclusive education setting, and their job prospects after completing the senior phase. The author briefly mentions the barriers and facilitators, but primarily links them to employment.

Correa-Torres [48] conducted a pilot study on communication opportunities for students with deafblindness in an inclusive education classroom. Similarly, this study has a focused view but still mentions barriers and/or facilitators to communication in the classroom. Lastly, Romer and Haring [47] specifically focused on the frequency of social interactions of learners who are deafblind in the classroom. Their observations provide valuable information on the outcomes for inclusion, based on peer interactions. For these reasons, these studies will be discussed where relevant, but will not be integrated in detail like the remaining five studies. The limited number of studies on inclusive education, both locally and internationally, poses a significant challenge to gathering comprehensive evidence on inclusive education for learners who are deafblind globally. Notably, four of the included studies were conducted from 2010 to date, possibly indicating a growing and consistent interest in deafblindness and inclusive education.

3.1. Barriers and Facilitators to Inclusive Education

A nuanced qualitative analysis revealed several themes from the included studies. These themes emerged deductively, aligning with the access to education frameworks used to underpin this study, which are Tomaševski [16] and Ramaahlo, Tönsing [15]. Additionally, the data were analyzed inductively to allow for themes to naturally emerge, supporting the frameworks used in this study (Table 3). Furthermore, we included key observations from the studies as they pertained to inclusive education for learners with deafblindness.

Table 3. Themes and subthemes emerging from the articles included in this review.

Theme	Subthemes
Availability	• Number of available educational settings.
Accessibility	• Physical environment, • Assistive devices, • Social environment.
Acceptability	• Peer acceptability, • Staff attitude, • Lack of preparedness among staff.
Adaptability	• Strategies used in the classroom.

3.1.1. Theme 1: Availability of Educational Facilities

Subtheme 1.1 Number of Available Educational Settings

While it was difficult to ascertain the availability of schools offering inclusive education for learners who are deafblind, Dogbe and Anku [14] reported that in Ghana, "there is only one centre for these people [sic] in the whole country and we do not hear of them. The centre is an appendage for the Demonstration School for the Deaf at Mampong Akwapim with twenty students since 1978." On the other hand, Sichari, Bota [45] reported an improvement in inclusive education over the last 12 years, with the country adopting a systematic approach to formulating policies and implementing inclusive education practices. In 2009, the Kenyan government developed a Special Education Policy, which guided the implementation of inclusive education in some schools through integrated programs. These programs are supported by Sight Savers International of the United Kingdom and Christofel Blinden Mission of Germany. The authors further state that due to the urgent need for education for all, the government has since developed an Inclusive Education Policy (2018) that has reorganized inclusive activities not only in schools but also in tertiary institutions and working environments such as ministries, factories, industries, entrepreneurships, and self-employment ventures. Furthermore, professionals selected to enhance inclusive practices are trained at the Kenya Institute of Special Education (KISE), Kenyatta University, Maseno University, Moi University, and Masinde Muliro University of Science and Technology, among others. Finally, the authors conclude that the Inclusive Education Policy (2018) has empowered parents with a key role in the education of learners with special needs. As such, learners are eligible to attend any local institution of their choice.

In developed countries, although Chanock [46] does not directly address the availability of school/institutions offering inclusive education, the author states that in Australia, North America, and the United Kingdom, universities are required to make "reasonable accommodations" to support the efforts of students with disabilities. From this statement, while not explicitly stated, it can be assumed that universities in these regions offer inclusive education, hence the need for reasonable accommodation. It should be noted that reasonable accommodation is not synonymous with inclusive education; however, where possible, it should be incorporated within inclusive education [52].

Similarly, while Correa-Torres [53] does not delve into the availability of inclusive education schools, they state that the education of individuals who are deafblind has gradually changed from medically driven, institution-based services to the most recent models that include 'mainstreaming' and inclusion in general education settings. The Individuals with Disabilities Education Improvement Act (IDEIA) of 2004 (P.L. 108–446) serves as a statement of national policy in the United States to guarantee all students with disabilities a free and appropriate public education. Under the least-restrictive-environment (LRE) stipulation of IDEIA 2004, public agencies must ensure that students with disabilities are educated with students without disabilities to the maximum possible extent. Lastly, Sall and Mar [49] reported that at the time their study began, only eight students with deafblindness were known to be enrolled in fully inclusive, regular classrooms throughout New York State. They further added that only within the past 5–10 years of conducting their study have the unique issues regarding the inclusion of students with deafblindness been addressed. According to Ingraham, Daugherty [51], since the enactment of the Education of the Handicapped Act (EHA), P.L. 94–142, there has been an increasing number of students with combined vision and hearing impairments attending public school programs in the USA. Similar to EHA, the Individuals with Disabilities Education Act (IDEA), P.L. 101–476, ensures that students who are deafblind are entitled to a free and appropriate education in the least restrictive environment. However, unlike the EHA, IDEA mandates the provision of effective transition services for deafblind students. These services are coordinated with relevant educational and adult service agencies to address the individual needs of each student.

From the above, it is clear that inclusive education for deafblind learners is more readily available in high-income countries compared to low- and middle-income countries. These high-income countries benefit from more robust legislative support and resources, whereas lower-income countries often face greater challenges in implementing effective inclusive education practices.

3.1.2. Theme 2: Access to Educational Facilities

Subtheme 2.1: Physical Environment

Sall and Mar [49] highlight that social opportunities in a typical school setting can be lost if the classroom and school infrastructure do not accommodate accessibility needs. To ensure students with disabilities can fully engage in all facets of school life, it is crucial to establish an environment free of barriers. In their study, Sall and Mar [49] reported that Mitch's (a student who is deafblind) teachers "learned the significance of the arrangement of the physical environment for his social accommodation, including his interest in activities, ability to work with peers, sense of belonging, and independence. Through trial and error, they found which desk arrangement best accommodated Mitch's dual sensory impairments and promoted his opportunities for interacting with peers". Furthermore, a concerted effort was made to enhance hallway accessibility for Mitch by adding braille signs to classroom doors with room numbers and teachers' names. These braille labels not only facilitated Mitch's independent navigation but also increased awareness among other students regarding the needs of students with disabilities. Similarly, Ingraham, Daugherty [51] described the experience of a 12-year-old who was deafblind and had a physical disability, necessitating her to use a walker. To ensure her safety and avoid accidents in the hallways and on stairs, she used the elevator or ramps and was dismissed from class 5–10 min early to reduce the risk of collisions with other students.

In low- and middle-income setting, Dogbe and Anku [14] described how the university put structures in place for a student who was deafblind and arranged with the residence hall manager to provide decent accommodation for the student, her mother, and her tactile sign language interpreter. On the other hand, Wakuru, Kisanga [50] noted that some deafblind students were seated at the back of the classroom, where poorly arranged furniture with sharp edges hindered their mobility. One participant remarked on the challenge of arranging the furniture, stating, "it is very difficult to arrange the classroom with a large number of pupils and a lot of desks, because this space is not enough. There are even broken desks kept at the back of the classroom."

The physical environment significantly impacts the inclusion of deafblind students. Effective classroom arrangements, such as adding braille signs and optimizing layouts, are crucial for accessibility, as shown by Sall and Mar [49]. In contrast, lower-income settings face challenges like poorly arranged furniture that hinders mobility, as noted by Wakuru and Kisanga [50]. While efforts are made to improve accommodations, consistent and thoughtful adjustments are needed to ensure all students can navigate their educational spaces effectively.

Subtheme 2.2: Assistive Devices

Five of the studies included in the review detailed the different devices used by their students. However, among students in low- and middle-income countries, there seems to be a discrepancy in the accessibility of assistive devices. For instance, Dogbe and Anku [14] note that a participant had to walk around with her braille machine "because, according to the Head of the Department of Special Education, I should do that for those who cannot sign to me but can braille to communicate with me." Assistive technology devices help students access information and succeed in the classroom [54]. Similarly, Wakuru, Kisanga [50] lamented the impact of not having appropriate and/or sufficient assistive devices on the learning outcomes of the learners who are deafblind. In their study, one teacher commented: "we encounter a serious problem of shortage of special materials,

which means that we cannot give our pupils with deafblind disabilities appropriate support. In fact, a lack of materials prevents us from using the learner-centred approaches."

Mitch, on the other hand, benefited from the school's purchase of an auditory scanner, which enabled him to use the same reading materials as his peers, saving valuable time that would have been spent on brailling texts. Additionally, he had access to a laptop computer equipped with adaptive devices for blind users, along with a talking calculator and a talking dictionary. Mitch did not require adaptive physical education; instead, his gym teacher ensured his inclusion in games and sports by involving him in all exercise routines and assigning him specific roles in team sports [49]. Likewise, a student in the study by Ingraham and Daugherty [51 had access to an optical character recognition scanner, ink-print printer, braille embosser, Optacon, typewriter, desktop computer, refreshable braille display, and a telecommunication device for deafblind users. These devices were funded through the educational system and vocational rehabilitation program. Notably, this creative funding arrangement allowed the student to keep the equipment after graduation.

These findings highlight a significant disparity in the availability and accessibility of assistive devices for students with disabilities, particularly in low- and middle-income countries. While students in more affluent settings benefit from comprehensive support and technology, those in less resourced areas often face challenges due to limited funding and resources, affecting their educational outcomes

Subtheme 2.3: Social Environment

Despite the challenges faced by Dogbe and Anku's [14] participant, she showed up at social gatherings. The authors reported that 'Her attendance at social gatherings is encouraging given that communicating with her is problematic since she cannot express herself easily and fluently with others. This easy-going tendency exposes her to many opportunities in the social realm, so she does not remain isolated and ostracized". On the other hand, Correa-Torres [48] details the nature of the social experiences of three students who are deafblind, at three inclusive education schools. The author observed that while in all three instances, the students who are deafblind were assisted by their paraprofessionals and interveners, the opposite was observed during free time or play, when all interactions were with their peers. In Emily's case, students sat next to her during story time and played with her hair. With Mark, students wanted to play with him during recess, inside and outside the classroom, and all the girls sat next to Eric during story time and held his hand. On the contrary, Correa-Torres [48] observed that most of the social interactions or communication opportunities for learners who are deafblind were with adults, not peers.

3.1.3. Theme 3: Acceptability

Subtheme 3.1: Peer Acceptance

Dogbe and Anku's [14] participant stated that "In class, I am accepted by my peers as I contribute in class by asking relevant questions and answering the lecturer's questions also." Similarly, Sall and Mar [49] details how Mitch, when frustrated or tired, tends to engage in socially inappropriate behaviors, and despite this, his peers accept his unique behaviors. They even advocated that Mitch's privacy and right to engage in these behaviors should be respected. In an interview with Mitch's peers about their relationship with him, unanimously, all students agreed that the community school offered the best educational program for Mitch, because he is with people he knows and learns more important things for the future. They added that it was also good for them to "get used to other people". On the other hand, Chanock [46] mentioned that, in addition to providing helpful feedback on Elizabeth's written work, instructors also needed to ensure her inclusion in class discussions. To achieve this, one lecturer implemented a strategy where students identified themselves before speaking in tutorials. This practice helped the interpreter keep pace by repeating students' comments, ensuring Elizabeth's full participation in the

discussions. In relation to classroom social participation, Romer and Haring's [47] study on classroom social participation highlights the distinction between merely being present with peers and actively engaging in socially integrated activities for students who are deafblind. On average, these students participated in socially integrated activities for 84 min per day, with a median duration of 67.27 min. However, despite interacting with a significant number of peers, the interactions were brief. For example, one student had contact with 22 different peers, yet each peer engaged with the deafblind student no more than three times over a span of 38 days. The study also found that increased time spent in socially integrated activities within general education areas was positively associated with the number of peers who had contact with the students who are deafblind. The authors concluded that although they support the inclusion of students with deafblindness in settings with their peers, those who spent the most time with their peers often experienced the most unstable and short-lived interactions, raising concerns about the potential for forming lasting friendships. Similarly, in a study by Ingraham, Daugherty [51], the main concern for parents and instructors of three students in an inclusive education program was the students' social isolation, despite their academic success and effective accommodations. The presence of interpreters, intended to facilitate communication, inadvertently became a barrier to peer interaction, as they were often perceived as authority figures rather than neutral support. This perception sometimes extended to scholastic competitions, where interpreters were seen as giving the deafblind students an unfair advantage. Despite feeling disconnected from their peers, the students valued the high-quality education they received in these inclusive environments, considering it a significant benefit that outweighed the social challenges.

These studies collectively highlight the complexities of social integration for students who are deafblind within inclusive educational settings. While these students often achieve academic success and receive substantial support, their social experiences can be fraught with challenges. Peer acceptance varies, with some students finding a supportive community, while others struggle with feelings of isolation and brief, unstable interactions. The presence of interpreters, though essential for communication, can unintentionally hinder social connections. Despite these social hurdles, the quality of education in inclusive environments remains a crucial advantage, highlighting the importance of balancing academic support with efforts to enhance social inclusion.

Subtheme 3.2 Staff Attitude

Correa-Torres [48] observed that the teachers, paraprofessionals, and interveners involved in the study generally had a positive attitude toward inclusion and actively participated in the process. They reported several benefits of inclusion, such as personal fulfillment, improved social relationships between students with deafblindness and their non-disabled peers, noticeable progress in the students with deafblindness, and positive effects on sighted students. However, these educators also faced significant challenges, primarily due to a lack of training for working with students who are deafblind and uncertainty about how to integrate these students effectively into classroom activities.

Sall and Mar [49] also noted a positive attitude towards Mitch's inclusion, especially from the principal and staff. According to the authors, the principal did not view Mitch's program as "inclusive" but rather saw the school as the best environment for Mitch's education. Even after Mitch moved to middle school, the elementary school principal remained involved, collaborating closely with Mitch's teachers, parents, and consultants. The school invested in an auditory scanner for Mitch, allowing him to use the same reading materials as his peers and saving time previously spent on brailling texts. Mitch's teachers also adapted to working closely with his assistant teacher, taking on flexible roles to meet the needs of different situations.

Dogbe and Anku [14] highlighted mixed feelings among staff regarding the inclusion of a deafblind student. One participant expressed skepticism about the feasibility of including a deafblind student in the university, noting, "I sometimes still feel that the

Department of Special Education has rushed into this project; however, it is surprising how the University management and the Ghana Education Service have embraced the whole project." Despite these doubts, the participant acknowledged the commendable efforts of the university management and the Ghana Education Service in supporting the initiative. The student, however, voiced frustrations, stating, "Generally, it was required of every student in the university to work hard—therefore, much was expected from me—the deafblind learner, but nobody helps the fresh student, not even the one with disability." Nevertheless, the student appreciated the accommodations made by her lecturers, which included provisions for her, her mother, and a tactile sign language interpreter. Despite these efforts, she still faced challenges, such as being instructed by the Head of Department to carry "a machine that is clumsy and quite heavy to carry about.".

Subtheme 3.3: Inadequate Preparation of Educators

The common theme among all the studies included in this review is the inadequate preparation of stakeholders. Authors lamented that educators lack the education and training necessary to provide inclusive teaching and learning in the classroom. For instance, Dogbe and Anku [14] reported that one educator expressed concern about not knowing sign language when first encountering a learner who is deafblind, despite being fascinated and curious. Another teacher shared the following:

> "*My first challenge was that there was no in-service training. No workshops were organized for us. No training whatsoever was provided. Under normal circumstances, they can give us some one-week in-service training to acquaint ourselves with how to handle special learners alongside non-disabled peers; hitherto, they used to give us a few days of training for blind and deaf students before the start of every academic year, but this time nothing happened*."

Additionally, Correa-Torres [49] recommended that educators receive training through supportive interventions such as collaborations and in-service training to enhance their knowledge and skills in promoting social and communication opportunities for students with deafblindness and their peers, especially in inclusive classrooms. Correa-Torres [53] highlighted that most participants lacked formal training to work with students who are deafblind, and there was an inclusion facilitator in only one school. Consequently, it was possible that the participants did not know which strategies to use or how to effectively use the strategies they were familiar with. Wakuru, Kisanga [50] also emphasized the challenge of teachers' lack of knowledge and skills in their study. One participant admitted, "I do not know how to prepare a lesson plan that considers individual learning needs", while another expressed, "I don't have the knowledge to consider diverse needs in the lesson plan".

3.1.4. Theme 4: Adaptability

Subtheme 4.1 Strategies Used in the Classroom

Different strategies were used in the classroom to enhance the learning environment. For instance, Correa-Torres [53] reported on educators providing assistance, direction, and positive, affiliative comments to facilitate play and engagement in the classroom. In some instances, peers without disabilities acted as "helpers" in the classroom. Additionally, the teacher engaged in "long conversations" with all students about disabilities and different learning styles, and modeled communication methods with deafblind students. Furthermore, they used "helpers" or "buddies" to encourage interaction between students with deafblindness and their nondisabled peers. On the contrary, Dogbe and Anku [14] reported that one teacher confessed that including the deafblind learner in higher education warrants some essential resources and is time-consuming. This was after the professional tactile sign language interpreter sent to the university to assist lecturers quit their assignment because it was time-consuming. Consequently, the student's mother was brought in to replace the professional sign tactile language interpreter. Similarly, Wakuru,

Kisanga [50] shared how teachers at a primary school felt that adapting lesson plans to include learners who are deafblind. In this case, the participant shared the following:

> "*Yes, I prepare a lesson plan in a general way without modifying it at any stage of the teaching and learning phase. I frequently use the same plan for teaching methods, learning activities, materials and assessments for all the pupils in my class*." [50].

This was confirmed by a fellow teacher who also stated "… I usually use the same lesson plan without changing the teaching method, materials and learning activities" [50]. This is concerning, as inclusive education mandates that suitable accommodations and adaptations should be implemented to support leaners with special educational needs. In this instance, it seems that these teachers are not taking this into consideration. This is in violation of the principles of inclusive education. To counter the above experience, Chanock [46] reported that Elizabeth had a range of accommodations to support her education. These included access to note-takers, recorded lectures and tutorials, and interpreting services. As her sight deteriorated, she was provided with a refreshable braille display. Additionally, Elizabeth received non-technical support, such as weekly meetings with her subject lecturers and interpreter. These meetings aimed to clarify her approach to assignments and negotiate appropriate modifications. For instance, instead of completing two short assignments like other students, she could delve into one topic more deeply and extensively. This approach allowed her to develop knowledge and skills while reducing the number of sources she needed to focus on. Sall and Mar [49] narrated a beautiful scenario where Mitch's classmates noticed that he was not singing along with other students during the chorus. When the teacher asked for solutions to help Mitch sing along, the students suggested to braille the music sheets and rehearse with Mitch. Furthermore, to accommodate Mitch's unique needs without reducing classroom time, educators arranged for his braille instruction to take place in the morning before the school day started. During the classroom's "independent work" period, Mitch utilized the resource room, working individually, just like his peers who were either engaged in independent or small group activities. Furthermore, the principal, teaching staff, consultants, and private instructors collaborated to identify and provide the necessary equipment and adaptations to support Mitch's learning and participation. Each year, an assistant teacher was assigned to Mitch to adapt materials and lessons, provide direct support, and work with other related service providers. Similarly, Ingraham, Daugherty [51] recounted that one student in their study could understand spoken language with the help of a hearing aid when seated at the front of the classroom and was able to communicate verbally and did not require extensive communication support services or a sign language interpreter, as his speech was easily understood by both instructors and peers. However, in the classroom, he had access to a resource instructor who played a crucial role in his educational program, providing support alongside itinerant vision consultants, which allowed the student to participate in various academic competitions. Academically, his program was on par with that of his nondisabled classmates, with the added requirement that teachers prepare lessons and assignments several days in advance to allow for transcription into accessible formats.

4. Discussion

4.1. Availability of Educational Facilities

The implementation of inclusive education policies in sub-Saharan Africa, while progressing, remains fraught with challenges, particularly for learners with disabilities such as deafblindness. Although 42% of the countries in the region have reportedly adopted inclusive education policies, the reality is that many children with disabilities still face significant barriers in accessing and completing their education [52]. These barriers are multifaceted and vary depending on the specific nature of the child's disability [54]. For learners who are deafblind, the situation is especially challenging. Deafblindness, being a low-incidence disability, is often overlooked in educational planning and policy

development [55,56], particularly in sub-Saharan Africa. This neglect results in the limited availability of specialized educational facilities and programs that can adequately cater to the unique needs of deafblind students [18]. As noted, very few schools within the region offer inclusive education tailored specifically for learners with deafblindness. This shortage has serious implications, particularly because deafblindness is not always recognized as a distinct disability in some countries. For example, in South Africa, it is often grouped with either deafness or blindness, rather than being treated as a standalone condition requiring specific interventions [18]. The lack of recognition and appropriate educational settings for deafblind learners means that these students are frequently excluded from mainstream educational opportunities. According to Peters [56], this exclusion is further exacerbated by the limited resources and infrastructural challenges that many low- and middle-income countries in the region face. In contrast to high-income countries, where legislative frameworks such as the Individuals with Disabilities Education Act in the United States mandate the inclusion of students with disabilities in general education settings, LMICs often struggle to implement similar policies effectively. Moreover, the stigma and lack of awareness surrounding disabilities like deafblindness contribute to the marginalization of these learners. As Wapling [57] highlights, there is often a significant gap between policy and practice in LMICs, where inclusive education is more of an aspirational goal rather than a fully realized reality. This gap is particularly pronounced in rural areas, where educational resources are scarce, and teachers are often ill-equipped to handle the needs of learners with complex disabilities [22]. In comparison, high-income countries have made more substantial progress in integrating learners with disabilities into mainstream educational settings. As Correa-Torres [48] discusses, the shift from medically driven, institution-based services to inclusive models in general education settings has been a significant development in countries like the United States. This shift is supported by robust legal frameworks that ensure students with disabilities receive appropriate accommodations and are educated alongside their non-disabled peers to the greatest extent possible. However, even in high-income countries, the inclusion of deafblind learners is not without challenges. Sall and Mar [49] report that, despite legislative support, the actual number of deafblind students enrolled in fully inclusive settings remains low, indicating that barriers to full inclusion persist even in well-resourced contexts. In conclusion, while there is a growing commitment to inclusive education in sub-Saharan Africa, the specific needs of learners who are deafblind are often inadequately addressed due to a combination of policy gaps, resource limitations, and societal attitudes. To bridge these gaps, it is crucial to adopt a more nuanced understanding of disabilities like deafblindness and to develop targeted strategies that ensure these learners are not left behind in the push for inclusive education.

4.2. Access to Educational Facilities

The inclusion of deafblind students in educational settings is profoundly influenced by the physical, assistive, and social environments. Sall and Mar [49] highlight how adaptations in physical environments, such as strategic classroom arrangements and the addition of Braille signage, can significantly enhance accessibility and social integration for deafblind students. These adaptations not only facilitate navigation but also foster a sense of belonging and independence. This reflects broader findings that suggest that environmental modifications are crucial for the effective inclusion of students with severe sensory impairments [58]. In contrast, lower-income settings face substantial challenges in creating supportive environments. Wakuru, Kisanga [50] describe how poorly arranged classroom furniture and insufficient space can impede the mobility and learning of deafblind students. This aligns with broader research indicating that infrastructural limitations in low- and middle-income countries often lead to inadequate support for students with disabilities [59,60]. These constraints are exacerbated by financial limitations, which hinder the implementation of necessary physical adjustments [61]. The issue of affordability, as introduced by Ramaahlo, Tönsing [15], further complicates these challenges. In low- and

middle-income countries, affordability directly impacts the accessibility and sustainability of assistive devices for students with disabilities, adding a critical fifth dimension to Tomaševski's [16] 4A framework, which originally considered availability, accessibility, adaptability, and acceptability. The disparity in access to assistive devices is stark, particularly between high-income and lower-income settings. According to Sæbønes, Bieler [62], only 5–15% of children with disabilities in low-income countries have access to assistive technologies or assistive devices. This is primarily due to limited budgets for assistive devices, with funding often sourced from donor agencies supporting the education sector [10]. This scarcity of resources significantly affects the learning experiences of deafblind students, further exacerbating the educational divide between richer and poorer nations. Sæbønes, Bieler [62] report that the reliance on donor funding is a significant barrier to the consistent availability of assistive technologies, highlighting the need for more sustainable funding models to ensure that assistive devices are accessible to all students who need them [63]. Hayes and Bulat [10] emphasize the importance of ensuring both physical and communication accessibility in schools to support inclusive education. They advocate for all new schools to be fully accessible and for existing schools to be gradually upgraded. Furthermore, they argue that national accessibility standards should mandate the implementation of various features to support students with different disabilities. In developing these standards, countries are encouraged to consider international best practices, such as those provided by the International Standards Organization [52], to guide the creation of effective domestic policies. Social integration is another critical aspect influenced by environmental factors. Correa-Torres [53] notes that while some students with deafblindness experience supportive peer interactions, others face isolation due to inadequate communication supports. Hayes and Bulat [10] further argue that effective inclusion requires not only physical and communication accessibility but also proactive efforts to ensure that social interactions are facilitated within educational settings. This involves establishing standards and practices that support social inclusion and address the specific needs of deafblind students. Therefore, creating inclusive environments for deafblind students requires addressing multiple dimensions: physical accessibility, the availability and affordability of assistive devices, and social integration. High-income countries often have more resources to implement comprehensive supports, whereas lower-income settings face significant barriers that impede full inclusion. Addressing these disparities necessitates coordinated efforts to improve infrastructure, enhance the availability and affordability of assistive technologies, and foster inclusive social environments.

4.3. Acceptability

The acceptability of inclusive education for deafblind children is intricately linked to their social integration and the capacity of educational systems to meet their specific needs. Research consistently shows that these students often face significant challenges in forming and maintaining social connections within inclusive settings. Romer and Haring [47] observed that while students who are deafblind may interact with a considerable number of peers, these interactions are often brief and lack the depth needed to foster lasting relationships. This finding aligns with the observations of Jaiswal, Aldersey [21], who noted that individuals with deafblindness frequently encounter barriers in social interaction due to the differing modes of communication between themselves and others. To address these barriers, individuals who are deafblind utilize a variety of communication strategies, including the use of interpreters [30]. According to the World Federation of the Deafblind [64], deafblind interpreting is essential for individuals with deafblindness to achieve full participation, equality, independence, and self-determination. However, as observed in this study, while the role of support staff, such as interpreters, is critical in facilitating communication, it can inadvertently hinder peer interaction. Ingraham, Daugherty [51], noted that the presence of interpreters, though essential, can create a social barrier, as they may be perceived as authority figures rather than facilitators of interaction. This dynamic is further explored by McLinden, Douglas [65], who, in their study

on learners who are deaf, concluded that while interpreters are crucial for accessibility, their presence can sometimes limit direct peer-to-peer communication, thus affecting the social integration of students. These findings are consistent with the experiences of learners who are deafblind in inclusive education settings. Despite these challenges, the academic benefits of inclusive education for deafblind students are well-documented. Sæbønes, Bieler [62] maintain that when deafblind students receive appropriate support, they can achieve academic success in inclusive settings. However, academic success does not always translate into social acceptance, as these students often remain on the periphery of peer groups. This issue is compounded in low- and middle-income countries, where the availability of assistive technologies is limited. Hayes and Bulat [10] argue that the lack of necessary assistive devices due to budget constraints further exacerbates the social isolation experienced by deafblind students. In response to these challenges, it is crucial for inclusive education systems to focus not only on academic support but also on enhancing social participation.

4.4. Adaptability

Adaptability in classroom strategies is crucial for effectively supporting deafblind students, as their educational needs require tailored approaches that balance academic support and social integration. The use of peer assistance and individualized support strategies has been shown to enhance the learning environment for deafblind students [23]. Correa-Torres [53] found that educators who provided assistance and direction, engaged in long conversations about disabilities, and used "helpers" or "buddies" effectively facilitated engagement and interaction. This approach aligns with research by McLinden, Douglas [65], which indicates that peer-mediated strategies can promote social inclusion and improve academic outcomes for students with disabilities. Additionally, the integration of assistive technologies and personalized accommodations is critical. Kiprotich, Milimu [66] described how leaners with visual impairments benefit from accommodations such as note-takers and braille display, which allowed for effective participation and academic success. The findings of this study are applicable this review. This approach supports the importance of providing tailored resources and support to meet the specific needs of students who are deafblind [23]. Despite these positive strategies, in some contexts, challenges remain in adapting lesson plans and resources to accommodate deafblind students. Wakuru, Kisanga [50] reported that some teachers used the same lesson plans for all students without modifications, which contradicts inclusive education principles. This issue is supported by the work of Lindner and Schwab [7], and Westwood [61], who emphasize that effective inclusive education requires differentiation and adaptation to meet diverse needs. Dogbe and Anku [14] highlighted the difficulties experienced when a professional interpreter resigned, leading to the student's mother taking over. This situation highlights the challenge of relying on specific support personnel and the need for robust contingency plans. Similarly, the study by Ingraham, Daugherty [51] demonstrates that while some students can manage with minimal support, others require more extensive adaptations to fully participate in educational activities. Successful adaptations often involve collaborative efforts among educators, peers, and support staff. Sall and Mar [49] illustrated a scenario where classmates collaborated to adapt music resources for a deafblind student, reflecting the benefits of involving the entire classroom in supporting inclusion. This collaborative approach is supported by the findings of Utley, VanScoyoc [67], who found that inclusive practices that involve peers in supporting students with disabilities can enhance both academic and social outcomes. Similarly, Ingraham, Daugherty [51] described how a resource instructor played a crucial role in supporting a student with hearing and vision impairments. This highlights the importance of flexible support systems and the positive impact of individualized support on student participation and academic achievement. The evidence suggests that while effective strategies and individualized support can significantly improve the learning experience for deafblind students, their success is contingent upon the adaptability of educational practices and the

availability of resources. Educators must be prepared to implement and adjust strategies that address both academic and social needs, ensuring that support systems are sustainable and responsive to the diverse needs of deafblind students. In practice, this involves investing in professional development for teachers to enhance their understanding of inclusive practices, ensuring the availability of necessary assistive technologies, and fostering a collaborative classroom environment. By addressing these factors, inclusive education can become more effective in providing equitable opportunities for all students.

5. Conclusions

In conclusion, inclusive education is not achieved merely by integrating children with disabilities into classroom/lecture room. Instead, it requires a transformation in teachers, schools, and educational systems to better accommodate the diverse needs of all learners and students and ensure their full participation in all aspects of school life [60]. This includes identifying opportunities for availability, accessibility, adaptability, acceptability and affordability, as highlighted by Ramaahlo [15], especially in low- and middle-income countries. This will, in turn, address physical and social barriers within and around the educational facility that hinder learning, and actively work to reduce or eliminate these obstacles. Consequently, inclusive education involves fundamentally changing how educational facilities currently operate, which benefits all learners and enhances the overall cost-effectiveness of the education system [60].

In the context of deafblind children, this transformation is even more critical. Deafblind students face unique challenges that require specialized and adaptable support, availability, and accessible resources. For instance, communication barriers must be addressed by incorporating assistive technologies, tactile communication methods, and providing trained interpreters proficient in both sign language and braille. Classrooms must be physically arranged to facilitate the mobility and orientation of deafblind students, ensuring that they can navigate the space independently and safely.

Moreover, social inclusion for deafblind learners involves creating a classroom environment that fosters peer interactions, acceptability and understanding. This can be achieved through sensitivity training for learners and staff, promoting an inclusive culture where differences are respected and valued. Schools should also ensure that extracurricular activities and school events are accessible to deafblind learners, allowing them to participate fully and equally with their peers.

Overall, the inclusive education of deafblind children demands a comprehensive approach that goes beyond mere physical integration. It requires a commitment to creating an environment where all aspects of school life are accessible and accommodating, ultimately benefiting all learners and making the education system more inclusive and cost-effective. While this paper gives a glimpse of the current barriers and facilitators to inclusive education that are documented in the literature, the authors would like to acknowledge that much research still needs to be conducted in the area of deafblindness.

Author Contributions Conceptualization, K.P.M. and N.M.; methodology, G.K., K.P.M. and N.M.; software, G.K., K.P.M. and N.M.; validation, G.K., K.P.M. and N.M.; formal analysis, N.M.; investigation, G.K., K.P.M. and N.M. resources, G.K., K.P.M. and N.M. data curation, G.K., K.P.M. and N.M. writing—original draft preparation, G.K., K.P.M. and N.M. writing—review and editing, K.P.M. and N.M.; project administration, K.P.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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