

Curricular Adaptation for Visually Impaired Students: Problems and Prospects

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ABSTRACT

Adapting curricula is crucial for providing equal access to participation and meaningful learning opportunities for students with visual impairments. Even with the growing progress in inclusive education and supportive policy frameworks, these students face various challenges in accessing and participating in regular courses, especially in higher education. This review paper tries to explore the problems and possible solutions for adapting curriculum for students with visual impairments at the higher education level. It covers national and international studies published from 2009 to 2026 using various sources like Google Scholar, Scopus, ERIC, Sodhganga, UGC, and Government reports. The findings highlight key barriers such as unpreparedness of teachers, inaccessibility of learning and digital resources, difficulties with traditional assessments, limited support from institutions, as well as social and academic obstacles. On the other hand, the review also indicates prospects, including opportunities such as teacher training, expansion of the use of assistive technologies, adaptation of a child-centric approach, use of multi-sensory pedagogical practices, integration of the Universal Design for Learning principles and use of subject-specific tools like tactile graphics and 3D-printed models. In conclusion, the review explains that effective curricular adaptation relies on flexible, accessible and well-supported design instead of a one-time fixed design. This approach can help students with visual impairments to take part more equally and improve their learning experiences in higher education.

Keywords: Visual impairments, higher education, curricular adaptation, assistive technology, curricular accessibility.

INTRODUCTION

Visual impairment is a condition that can significantly impact all areas of child development; it covers a wide range that makes it difficult for people to read printed materials and take part in educational activities, while education plays a critical role in determining their overall quality of life and long-term social and economic position. Worldwide, about 2.2 billion people have some form of visual impairment; among them, 90% live in low- to middle-income countries, where inclusive policies are still developing (WHO 2023).

There are two main categories of visual impairments: blindness and low vision. Blindness means almost no vision and requires a different path to access information, like Braille, tactile graphics, or screen readers. In low vision, students still have some sight but need large digital tools, better light, and magnifiers, and various digital devices to learn. In the classroom, students with visual impairments, including the blind, low vision, or functional vision loss, regularly face challenges in accessing curriculum that is designed for sighted students. Inclusive education policies, supported by the Salamanca Statement (1994) and the United Nations Convention on Rights of Persons with Disabilities Act (2006), aim to ensure that all learners have the right to access equal and quality education, but for visually impaired students, the curriculum does not meet these promises (Miyauchi, 2020). The movement towards inclusive education has also significantly

influenced educational policy in India. The Rights of Persons with Disability (RPWD) Act 2016 emphasised equal educational opportunities, proper accommodation, and accessibility for persons with disabilities. The National Education Policy (NEP) 2020 also emphasized inclusive and equitable quality education by promoting flexible curricula, accessible learning resources, assistive technologies, teacher capacity building, and universal access to higher education. According to the University Grants Commission (UGC), higher education institutions are established with an equal opportunity cell, disability support services, and accessible campus infrastructure. Although there have been progressive policy initiatives, research shows that implementation is still inconsistent across institutions. Students with visual impairments often report a lack of accessible learning materials, limited access to assistive technologies (Kelly & Smith, 2011), inadequate faculty training (Ravenscroft et al., 2019; Javed et al., 2025), inaccessible assessment systems, and insufficient institutional support (Toran et al., 2009; Negash & Gasa, 2022). These challenges are especially common in university settings.

The term curricular adaptation refers to making changes in the content, teaching methods, materials, and assessments to help students with diverse needs achieve the same learning outcomes as their peers. Basically, there are two main types of adjustment: physical access accommodations (ramps, adapted furniture, and low-vision optical devices) and communication access accommodations, such as braille, audiobooks, screen readers, and sign-supported instruction (McCarthy, 2015). When a larger number of visually impaired students are interested in entering higher education, the idea of curriculum adaptation becomes most important. Adapting the curriculum is key to ensuring fair participation for all in an academic setting, as it helps in bridging the gap between the traditional system of education and the new sensory needs of visually impaired students (McCarthy, 2015). It also promotes equal participation of students without lowering their academic standards. For students with visual impairments, the curriculum is not just about content, but also it is about how that content is delivered. If the way it is delivered is not adapted, even the most capable students can be left out of learning.

In higher education, curricular adaptation is even more important because of the online learning system, digital libraries, virtual classes, and multimedia resources. But they also bring new problems because assistive technologies do not work properly for students with visual impairments to access them as their own. Many educational institutions broadly focus on sight-based tasks, so including the expanded core curriculum, which covers compensatory skills, assistive technology, and sensory efficiency, is crucial for students to become independent and succeed in the long term (Tahiri, 2023; Fundelius, 2025). Even with these teaching goals, students still face challenges because curricula tend to favour visual learning, making it important to move towards more inclusive, multisensory teaching methods (Nyugap, 2018). This study looks at the challenges of changing vision-centric academic standards into flexible, accessible ones that meet the diverse sensory needs (Sinkala et al., 2026).

Objective

This narrative review aims to fill the gap by analysing the literature on how higher education curricula are adapted for visually impaired students. The review is based on four main objectives: to find out the problems that students face in accessing the curriculum, to examine the different adaptations used to address these issues, to identify promising practices and future opportunities for improving accessibility, and to find out research gaps that will help future studies.

Based on these objectives, three pertinent research questions were formulated

1. What challenges do the visually impaired students face in accessing the standard curriculum in higher education?
2. Which adaptations have been implemented to enhance curriculum accessibility?
3. What evidence is present regarding the effectiveness and prospects of these adaptations?

METHODOLOGY

This study uses a narrative review to examine the literature on curricular adaptation for students with visual impairments in higher education. It provides a thorough and interpretative summary of research from various sources. A narrative review enables the integration of empirical studies and policy documents to develop a holistic understanding of the problems and prospects aligned with curricular adaptation for students with visual impairments.

Search strategies:- To find relevant national and international studies, the search included electronic databases such as Scopus, Web of Science, ERIC, and Google Scholar. Indian perspective searches were done in Sodhganga, the University Grants Commission, and government publications. Additional report form International organization like the World Health Organization (WHO), United Nations Educational, Scientific and Cultural Organization (UNESCO), and University Grants Commission (UGC) were reviewed to understand pedagogical practices and inclusivity.

Keywords used in searching: Curricular adaptation, curricular accessibility, visual impairments, blindness, low vision, assistive technology, teacher preparedness.

Problems of Curricular Adaptation for Students with Visual Impairment

Effective curricular adaptation largely depends on collaboration among teachers, learning materials, instructional strategies, assessment procedures, use of advanced technology, learning environment, and institutional support. Review of relevant literature indicates that students with visual impairments face multiple challenges that hinder their participation and achievement in academics. These challenges are most significant when the prescribed curriculum is based mainly on visual, limited teacher preparedness to adapt the curriculum, inaccessible learning resources, inadequate learning environment, and lack of institutional support (Miyauchi, 2020; Diasse & Kawai, 2025).

The major challenges related to curricular adaptation are discussed below.

Teacher Preparedness

Teacher preparedness is one of the most consistently reported problems in inclusive education. In the teaching-learning process, teachers may express a positive attitude towards diverse learners and support inclusive education while simultaneously reporting limited knowledge, practical skills, and confidence to adopt the curricular contents and teaching strategies for students with visual impairments (Ravenscroft et al., 2019; Diasse & Kawai, 2025; Miyauchi, 2020). The teachers who received in-service training felt more confident and had positive responses towards students with visual impairments (Ravenscroft et al., 2019). At the same time, Diasse and Kawai (2025) noted that a regular teacher with a lack of adequate training and skills, including limited competence in braille and appropriate teaching strategies for supporting visually challenged students, has shown low self-confidence. These teachers may unknowingly exclude the visually impaired students from classroom activities. The teachers teaching students with visual impairments at the university level experienced limited awareness of the barriers faced by these students, while the institutional support was frequently insufficient (Firat, 2021). For example, most of the music teachers in an inclusive setting are not sufficiently included in resource development during their training to support visually challenged students and demonstrate the need for specific professional development of teachers (Pino, 2022). On the basis of these reviews, a teacher with a positive attitude is not enough; they need ongoing professional development for an inclusive classroom for better use of assistive technologies and effective adaptation of curriculum.

Inaccessible Curricular Materials and Learning Resources

Limited learning resources and inaccessible curricular materials are other major issues faced by visually impaired students. Negash and Gasa, (2022) noted that in many institutions the students with visual

impairments do not learn independently due the shortage of braille books, screen reader software, audio-recorded materials, and very minimal resources; it is quite harder for visually impaired students to take part in classroom activities (Kija & Mgumba, 2025; Kana & Hagos, 2025; Odhiambo, 2024). Similarly, Dheesha (2020) identified that the availability and usability of screen reader software were very low because few institutions did not have the necessary software. The problem becomes more significant because most of the curricular content was adapted based on visual contents like diagrams, charts, images, scientific figures, and other graphical representations (Zebehazy & Wilton, 2014; Fanshawe et al., 2023).

Assessment and Evaluation Barriers

Assessment plays an important role in making the curriculum assessable for students with visual impairments. The prescribed curricular methods can create obstacles if the exam format, procedure, timing, materials, and feedback are not adjusted to meet the needs of students. From Odhiambo's (2024) viewpoint, accessible assessment means providing accommodations that allow students to show what they have learned, such as extra time, tactile graphics, oral exams, and accessible digital platforms. Research in higher education has found that issues like unsuitable exam formats, displays, problems with transcription, lack of feedback, and unfair grading can make assessment inequitable for these students (Mkumbo & Mtembei, 2019; Rasooli et al., 2025, Latif 2021; Eltahir 2023). Even when different assessment methods are offered, students with visual impairments may still face challenges. Because of lack braille skills they are not confident using computers and other technologies during exams (Lawis & Muzata, 2025). Therefore, inclusive assessment should provide appropriate accommodations, including accessible digital materials, extra time, braille or tactile formats. When needed, oral or other alternative ways to respond should also be included to help students to show what they know and can do, instead of testing their ability to navigate inaccessible formats (Bruce et al., 2018; Lawis Muzata, 2025).

Socio-Academic Barriers

Students with visual impairments also face social and academic challenges that go beyond how the curriculum is designed. Such challenges include negative attitudes from teachers and peers, low expectations, limited participation in class, limited interaction with peers, and struggling to find a supportive learning environment, which can hinder confidence, motivation, and academic results (Miyauchi, 2020; Abbas et al., 2024). At the same time, Miyauchi and Paul (2020) also noted that social interaction, acceptance, and a sense of belonging are key parts of inclusive education. Hence, they highlighted the importance of positive attitudes, supportive environments, and teacher knowledge to enhance inclusivity. Similarly, Nwosu et al. (2024) reported that participation of students with visual impairments depends on both social and institutional factors because they face barriers related to peer, lecturers, the university setting, and their families. However, in order to overcome such socio-academic barriers, Kija and Mgumba (2025) suggested that peer interaction and collaborative learning can offer academic help, emotional support, a sense of belonging, and more chances to participate. However, structured peer- support systems can help reduce isolation and increase engagement for students with visual impairments.

Subject- Specific Challenges

Visually impaired students face difficulties in accessing few subjects which basically rely on visual representation or hands-on experiences. Students with visual impairments may encounter particular difficulties in subjects like mathematics, sciences, geography, engineering, and physical education because these subjects rely more on visual representation, which is not easy for visually challenged students to understand (Miyachi, 2020 & Fanshawe et al., 2023; Klingenberg et al., 2019; Immelman, 2026). At the same time, Shoaib et al. (2023) found that audio feedback, tactile displays, accessible digital textbooks, and mathematics applications can support mathematical learning for visually impaired students; however, technological limitations continue to create challenges. Many educational institutions do not provide tactile models, audio, or adapted requirements and accessible teaching methods that decrease their interest in participation. Proper adaptation and use of assistive technologies can help to reduce these barriers (Fanshawe et al, 2023). Diasse and Kawai (2024) highlighted the significance of multisensory teaching,

environmental modifications, assistive technologies and suitable educational resources in their review of evidence-based strategies for students with visual impairments. Adapting the subject-specific curricula through tactile graphics, 3D models, verbal descriptions, accessible digital resources, hands-on activities and various assistive technologies can help in engaging visually impaired students in achieving intended learning outcomes (Klingenberg et al., 2019; Shoaib et al., 2023; Immelman, 2026).

Prospects for Effective Curricular Adaptation

Adapting the curriculum for students with visual impairments means making changes to content, teaching-learning strategies, assessment methods, and the learning environment that help the students to take part fully without lowering academic standards. Research on inclusive education shows that barriers to accessing curriculum are not just due to visual impairments, but also these challenges often come from a mix of students' needs and various issues. The issues include inaccessible materials, unprepared teachers, and limited assistive technology, weak institutional support, and rigid teaching and assessment methods (Diasses & Kawai, 2025; Miyauchi, 2020; Negash & Gas, 2022).

Hence, curricular adaptation should move away from one-off solutions for individuals and focus on designing a curriculum that is accessible, flexible, and supported by the whole institution. There are several key areas to consider;

Strengthening Teacher Preparation

Teachers' knowledge and skills are central to successful adaptation of curriculum. Research shows that many general education teachers do not feel well prepared to teach students with visual impairments, especially when lessons require braille, tactile materials, assistive technology, or subject-specific changes (Miyauchi, 2020). The review also found that teacher training, the use of effective teaching strategies, and the availability of suitable teaching and learning materials are key to improving access to academic subjects (Miyauchi, 2020). Similarly on the views of Ravenscroft et al. (2019) and Manyarela et al. (2025) suggested that both initial and ongoing training help teachers feel more positive and better prepare to teach students with visual impairments. Research on assistive technology shows that teachers need the right knowledge and training to choose, use, and support technology-based learning for these students (Zhou et al., 2011). Therefore, teacher preparation should go beyond building a positive attitude towards inclusion through ongoing professional development in accessible curriculum design, assistive technology, Braille and tactile resources, multisensory teaching methods, accessible assessment, and subject-specific adjustments. Building these skills can help teachers better meet the diverse needs of learners and help in creating such a learning environment where visually impaired students can fully participate (Miyauchi, 2020; Ravenscroft et al., 2019; Zhou et al., 2011).

Expanding the Use of Assistive Technology

Assistive technology can make curricula more accessible and help students with visual impairments access information on their own. With the help of such technological tools like digital magnifiers, screen readers, refreshable braille displays, audio textbooks, and mobile accessibility apps, students participate in different learning settings and improve learning outcomes (Dabi & Golga, 2026; Presley & Andrea, 2009; Tuttle & Carter, 2023; Rhoads et al., 2022). Still, not all students have equal access to these technologies, and many face challenges when devices, accessible materials, or technical support are missing (Abbas et al., 2024). Awang Zainal et al. (2026) noted that assistive technology gradually lowers barriers to participation and supports learning, social interaction, motivation, and self-confidence of these students. However, the review also pointed out ongoing problems like limited device ownership, lack of technical skills, insufficient training of technical skills and frequent technical issues, especially in low and middle-income countries (Juma & Ntulo, 2024; Barbareschi & Holloway, 2025; Gronlund et al., 2010). To address these issues, it is important not only to provide more devices but also to make technology affordable, ensure digital content is accessible, offer user training and technical support, and help teachers use these tools in daily teaching. This

well-rounded approach can help students with visual impairments access curriculum content more independently and take part more equally in higher education (Awang Zainal et al., 2026).

Adaptive Pedagogical Practices through Universal Design for Learning

In an inclusive setting, instructional strategies should be flexible to meet the needs of diverse learners. In order to adapt curriculum effectively, it is necessary to modify the pedagogical practices that are adaptable to the varied needs of students with visual impairments. Learner-centred instructional strategies like individualized instruction, peer tutoring, collaborative learning, and multisensory teaching will help to improve the participation and learning outcomes for students with visual impairments. (Abbas et al., 2024; Diasse & Kawai 2024; Odhiambo, 2024). These strategies can be further enhanced by adopting the Universal Design model (UDL), which can encourage diverse methods of engagement, representation, and action and expression to minimize the barriers and promote greater accessibility for every learner (Cumming & Rose, 2022; Manyarela et al., 2025; Schreffler et al., 2019). At the same time, McCarthy (2015) highlighted the increasing growth of technology, support both teachers and learners through specialized tools designed specifically for students with

visual impairments. Similarly, Odhiambo (2024) stresses the value of learner-centred teaching adaptation and Patricia (2024) discussed the increasing importance of typhlotechnology in supporting both teachers and students with specialized tools for visual impairments. Universal Design for Learning is a proactive approach to curriculum design that considers learner diversity from the beginning. Manyarela et al., (2025) argued that including UDL principles in curriculum planning makes learning more accessible for everyone.

Strengthening Collaborative Support System

A successful curricular adaptation depends on the collaboration of classroom teachers, special educators, supporting staff, families, and community organizations, as key components of inclusive education (Diasse and Kawai, 2024). Negash and Gasa (2022) highlight that, in the education of students with visual impairments, parents, non-government organizations, and local communities all play an important role. In a systematic review, Miyauchi (2020) adds that supportive teachers, effective teaching strategies, accessible resources, and other external support are important for students with visual impairments. Therefore, by working together, school, families, and community groups can make curricular adaptation more effective and lasting.

Policy Reform and Institutional Commitment

Many countries have accepted inclusive policies, but there is a need for greater institutional commitment to put these practices into action. Negash and Gasa (2022) stated that stronger government oversight, equitable funding, continuous professional development, and improved monitoring of inclusive education initiatives. Whereas Nguyen et al. (2024) suggested that the National Curriculum Framework should be integrated into inclusive education to ensure curriculum adaptation becomes a routine component of educational planning rather than an optional practice. Likewise, according to UNESCO (2020), inclusive education needs clear policies, enough funding, reasonable accommodation, and effective monitoring, rather than only policy commitment. In higher education, Palan (2021) found that students with visual impairments in India still face exclusion, a weak support system, and teaching practices that are not accessible, even though disability laws exist. To address these issues, institutions need to turn inclusive policies into real action by providing enough funding, accessible learning materials, trained staff, assistive technology to regular monitoring of implementation. Stronger institutional accountability can help ensure that curricular accessibility becomes an integral part of educational planning rather than an optional or individual responsibility (Negash & Gasa, 2022; Nguyen et al., 2024; Palan, 2021; UNESCO, 2020)

Subject- Specific Innovation

New innovative teaching strategies and advanced technology provide significant possibilities for modifying the curriculum to accommodate students with visual impairments, especially in subjects like science and

mathematics that heavily rely on visual representation. Tools like tactile graphics, 3D-printed models, accessible teaching-learning equipment, group experiments, use of audible cues offer opportunities for modifying the curriculum that are accessible in visually intensive disciplines, and these innovations have demonstrated considerable potential for enhanced student participation (Smith & Smothers, 2012; Jones et al., 2006;). Recent studies have highlighted the effectiveness of tactile and technology-driven methods in enhancing the accessibility of mathematical and scientific concepts for these students (Klingenberg et al., 2019; Singhal & Balaji, 2022; Immelman, 2026). This subject-specific innovation will ensure that all students have equitable access to mathematics and sciences without lowering academic standards (Abbas et al., 2024; Awang Zainal et al., 2026).

Inclusion and Exclusion Criteria

Sl. No	Parameter	Inclusion	Exclusion
1	Papulation	Students and learners with visual impairments	Students with other disabilities without separate findings for visual impairment
2	Educational level	Higher education, tertiary level	Primary and secondary education
3	Focus area	Adaptation of curriculum, curricular accessibility, modification of curriculum design for visually impaired students.	Medical and clinical rehabilitation
4	Related dimension	Teaching learning strategies, assistive and adaptive devices, digital technology, classroom environment, teacher preparedness	Not related to educational environment
5	Published year	Between 2009 and 2026	Literature published before 2009

CONCLUSION

Adapting curricula is essential for making higher education more inclusive for visually impaired students. This review shows that barriers to participation go beyond the availability of assistive devices. Students with visual impairments deal with inaccessible learning materials, untrained teachers, rigid assessment methods, difficulty in using digital tools, and lack of support from their institutions. Though advanced assistive technologies, Universal Design for Learning (UDL), and multisensory teaching models are existing for visually impaired students, their impact depends on institutional support, effective implementation, and coordination among educators and staff. Accordingly, the institution should integrate curriculum adaptation into planning, the teaching-learning process, and assessment methods.

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