

# EDUCATIONAL EQUITY IN THE DIGITAL AGE: A UNIVERSAL DESIGN APPROACH TO BROADCAST LEARNING FOR STUDENTS WITH DIVERSE ABILITIES

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## Abstract

As broadcast learning becomes a critical component of digital education, concerns about inclusivity and accessibility for students with diverse abilities have gained prominence. This paper explores how Universal Design for Learning (UDL) can be effectively applied within broadcast education systems to address issues of educational inequity. Drawing on a synthesis of literature, case studies, and UDL guidelines, the study identifies gaps in current broadcast learning models and offers a framework for inclusive content delivery. It concludes that broadcast learning, when aligned with UDL principles, holds the potential to democratize education and bridge accessibility divides in the digital age.

**Keywords:** Universal Design for Learning, Broadcast Education, Educational Equity, Accessibility, Diverse Learners, Inclusive Education.

## Introduction

The rapid digitization of education has transformed traditional learning modalities and pedagogical frameworks, leading to the emergence of diverse online and broadcast-based delivery systems. Among these, broadcast learning - which includes educational content delivered via television, radio, and livestream platforms - has gained prominence due to its wide accessibility and potential to reach students across geographic and socio-economic divides. During the COVID-19 pandemic, governments and institutions globally deployed broadcast learning to ensure continuity of education, particularly in regions with limited internet infrastructure or digital literacy (UNESCO, 2021; Van Dijk, 2020).

While broadcast learning expanded access in many ways, its delivery methods often remained rigid, content-centric, and non-interactive. Such one-size-fits-all models typically overlook the needs of learners with sensory, cognitive, and physical differences. Students with disabilities, neurodivergent learners, and those with specific learning preferences frequently encounter structural barriers in accessing and engaging with broadcast content (Gulati, 2021). For example, the absence of captioning, sign language interpretation, or adjustable pacing creates exclusionary environments, reinforcing existing educational inequities rather than mitigating them.

In this context, the Universal Design for Learning (UDL) framework emerges as a critical lens through which to evaluate and redesign educational broadcasting. UDL, developed by CAST (Center for Applied Special Technology), promotes inclusive curriculum development through multiple means of representation (what students see and hear), engagement (how students interact), and expression (how students demonstrate understanding) (Meyer, Rose, & Gordon, 2014). Unlike traditional accessibility retrofits, UDL emphasizes proactive planning to anticipate and accommodate learner variability from the outset.

While UDL principles have been successfully adopted in digital, blended, and classroom-based instruction, their integration into broadcast learning

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environments remains significantly under-developed. This gap is particularly concerning in countries where broadcast education is a primary or fallback mode of delivery, especially for students with limited digital access.

This paper investigates the alignment - or lack thereof - between UDL principles and current broadcast education practices. Drawing on cross-national case studies and thematic analysis, it explores key challenges in ensuring accessibility and proposes strategic, scalable interventions to enhance educational equity in the digital age.

## Review of Literature

Educational equity in the digital era is intricately linked to access, inclusiveness, and responsiveness to learner diversity. The "digital divide" encompasses not only disparities in access to devices and internet but also differences in content adaptability for students with sensory, cognitive, or physical challenges. Broadcast learning, though instrumental in reducing infrastructure dependencies, often replicates traditional classroom rigidity in a one-way communication format.

Several studies (Gulati, 2021; Yelland & Masters, 2020) have critiqued broadcast learning for neglecting learner agency and accessibility features. Programs like India's PM eVidya and Kenya's EduTV demonstrate reach, but often exclude features like captioning, sign language interpretation, or content pacing controls. In contrast, the UDL framework - originating from the work of CAST (Meyer et al., 2014) - provides a structured approach to inclusive learning design, adaptable across modalities. It encourages creators to embed accessibility from the outset rather than as an afterthought.

Despite its effectiveness in digital learning platforms, research applying UDL principles directly to broadcast education remains sparse. This gap presents an opportunity to conceptualize a framework that integrates UDL into broadcast settings to promote educational equity.

## Methodology

This study adopts a qualitative, conceptual analysis approach. It involves a critical review of academic

literature, policy documents, and case studies of national broadcast learning initiatives. Thematic analysis was used to identify recurring barriers to accessibility and compare them against the core guidelines provided by the UDL framework.

Broadcast education programs from India, Kenya, and the UK were examined for the presence or absence of UDL-aligned features such as multiple means of content delivery, learner interaction, and accessible feedback mechanisms. The analysis aimed to determine how well current systems address the needs of students with varied physical, cognitive, or technological abilities.

## Findings and Discussion

The analysis reveals that most broadcast learning models still prioritize content delivery and syllabus completion over adaptability, learner inclusivity, and engagement. Educational broadcasts are often built on the assumption that learners share a uniform set of abilities - that they can see, hear, process, and interpret content at the same pace and in the same format. This assumption fails to acknowledge the diversity of learning needs and overlooks the barriers faced by students with disabilities or cognitive variations.

Key accessibility features such as closed captions, sign language interpretation, adjustable playback speed, or multilingual content are either inconsistently implemented or completely absent in many national broadcast systems. Moreover, the lack of interactive features - such as feedback channels, mobile-based participation, or assignment submissions - prevents learners from engaging in meaningful two-way learning experiences. As a result, the broadcast model often reproduces traditional hierarchies in education, with limited accommodation for the realities of diverse learners. This study assessed three national broadcast learning platforms - India's PM eVidya, Kenya's EduTV, and the UK's BBC Bitesize - based on the presence of five core Universal Design for Learning (UDL) principles: multiple means of representation, engagement, and expression. The comparison is shown in the table below:

**Table 1: UDL Compliance in Broadcast Learning Programs**

| Country           | Sign Language Support | Captioning/Subtitles | Multilingual Options | Interactive Features (SMS/App) | Content for Cognitive Diversity | Score out of 5 (UDL Compliance) |
|-------------------|-----------------------|----------------------|----------------------|--------------------------------|---------------------------------|---------------------------------|
| India (PM eVidya) | No                    | No                   | Yes                  | No                             | No                              | 1                               |
| Kenya (EduTV)     | No                    | No                   | No                   | No                             | No                              | 0                               |

| Country           | Sign Language Support | Captioning/Subtitles | Multilingual Options | Interactive Features (SMS/App) | Content for Cognitive Diversity | Score out of 5 (UDL Compliance) |
|-------------------|-----------------------|----------------------|----------------------|--------------------------------|---------------------------------|---------------------------------|
| UK (BBC Bitesize) | Yes                   | Yes                  | Yes                  | Yes                            | Yes                             | 5                               |

The data illustrates that India and Kenya’s platforms remain largely inaccessible for learners with special needs, offering minimal or no features aligned with UDL principles. While PM eVidya includes multilingual support, it lacks other key features, reducing its overall accessibility. EduTV, on the other hand, offers no measurable UDL compliance, suggesting a broadcast model driven solely by curriculum coverage rather than learner adaptability.

In contrast, BBC Bitesize demonstrates significant alignment with UDL. It provides captions, transcripts, sign language content, interactive digital extensions, and content tailored for neurodiverse learners. This comprehensive approach exemplifies

how UDL principles can be practically embedded into national-level broadcast education to create equitable outcomes.

The findings highlight a critical gap between the aspirational goals of inclusive education policy and the actual implementation of accessible broadcast learning infrastructures. Without systemic redesign grounded in frameworks like UDL, broadcast education risks becoming exclusionary rather than empowering. A shift from teacher-centered broadcasting to learner-responsive design is essential to meet the needs of diverse learners in the digital age.

**Figure 1: Comparative UDL Compliance Scores Across Broadcast Learning Programs**

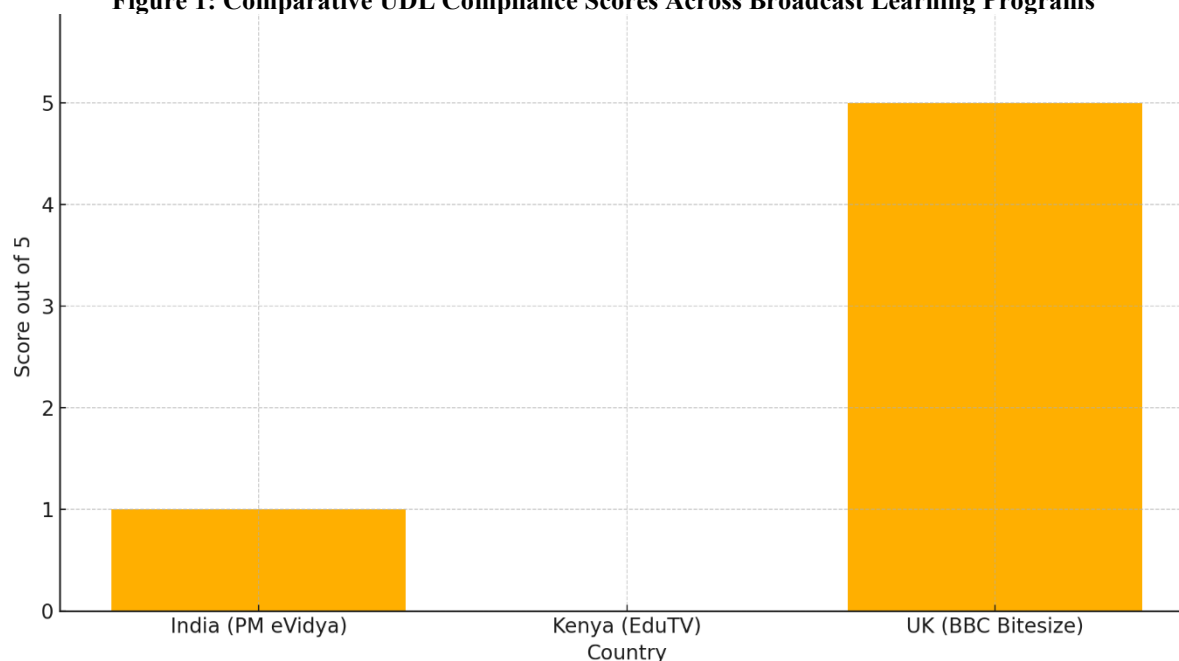


Figure 1 visually compares the UDL compliance scores across India’s PM eVidya, Kenya’s EduTV, and the UK’s BBC Bitesize programs. The data underscores the disparity in accessibility features, with BBC Bitesize leading in inclusive design while the other two programs lack core UDL elements.

UDL offers clear principles to address these issues. “Multiple means of representation” can be supported by captioning, audio descriptions, and multilingual subtitles. “Multiple means of engagement” may involve incorporating SMS-based participation, post-broadcast discussions, or companion mobile apps. Finally, “multiple means of expression” could be realized through flexible

assignment submissions or oral response options via phone or app-based platforms.

Applying UDL to broadcast education demands that content creators move from one-size-fits-all models to flexible, learner-centered approaches that anticipate variability. This shift would not only enhance equity for differently-abled students but improve engagement for all learners.

## Conclusion

Broadcast learning, while revolutionary in its potential to democratize education and reach remote or underserved communities, remains fundamentally limited in its current form. The

model's reliance on unidirectional content delivery, rigid formats, and minimal interactivity often results in the exclusion of students with disabilities, learning differences, and varied cognitive or sensory needs. Without intentional design interventions, broadcast education risks reinforcing systemic inequities rather than alleviating them.

The application of Universal Design for Learning (UDL) offers a transformative solution to this challenge. As a proactive, flexible, and research-informed framework, UDL shifts the focus from retrofitting accessibility features after content creation to embedding inclusivity from the outset. By incorporating multiple means of representation, engagement, and expression, UDL ensures that educational content is not only available but also meaningful, usable, and adaptable for all types of learners.

Implementing UDL in broadcast education demands a multi-layered approach. At the policy level, national education ministries and broadcasting authorities must mandate inclusive standards, allocate funding for accessibility tools such as captioning and sign language interpretation, and monitor compliance. At the pedagogical level, content creators and educators must be trained in designing curriculum and delivery methods that anticipate learner variability. At the technological level, innovation must prioritize compatibility with assistive devices, mobile feedback mechanisms, and alternative access pathways to enhance learner engagement.

The future of education in the digital age hinges on our collective ability to design for diversity rather than homogeneity. Equity cannot be an afterthought; it must be foundational. As digital platforms, AI-driven tools, and broadcast infrastructures continue to evolve, aligning them with UDL principles will ensure that no learner is left behind. In this age of unprecedented connectivity, educational equity is not merely a moral imperative - it is a prerequisite for global progress.

### Recommendations

To operationalize UDL in broadcast learning, educational authorities and content developers should:

1. Integrate accessibility tools such as sign language interpretation, captioning, and screen-reader-compatible transcripts into all broadcasts.
2. Offer multilingual options and simplified versions of complex topics to accommodate cognitive diversity.
3. Develop auxiliary platforms (e.g., WhatsApp, SMS, IVRS) for learner interaction and feedback.

4. Train educators and content producers in inclusive instructional design.
5. Encourage policy frameworks that mandate UDL compliance in national broadcasting initiatives.

These steps require investment but promise long-term returns in terms of learner engagement, retention, and equitable outcomes.

### Conflict of Interest

The authors declare that there is no conflict of interest in conducting this research.

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