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DEAF AND HARD-OF-HEARING LEARNERS IN EUROPEAN UNION POLICY: MEANINGFUL ACCESS ACROSS DISABILITY, EDUCATION AND ACCESSIBILITY FRAMEWORKS

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Abstract:
European Union (EU) policy increasingly frames disability and education through rights, inclusion and accessibility, yet it remains unclear whether these commitments address the distinctive linguistic and communication conditions of Deaf and hard-of-hearing learners. This study examines how EU disability, education, digital and accessibility frameworks represent these learners, establish the policy conditions for meaningful access, interact across policy domains and evolve between the 2010-2020 and 2021-2030 periods. A comparative qualitative policy analysis was conducted on 24 legal, strategic, technical and interpretive documents, combining directed coding derived from the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) with inductive thematic coding. The findings show that Deaf-specific linguistic and communication rights are articulated most clearly in the UNCRPD framework and a non-

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binding European Parliament resolution, whereas mainstream education policies generally subsume learners within broad disability or disadvantage categories. Digital and audiovisual instruments provide more operational requirements for captions, real-time text and accessible technologies, but these provisions remain weakly connected to pedagogy, support services and institutional responsibility. The later strategic period strengthens rights framing, participation and monitoring and consolidates the increasingly operational digital-accessibility architecture, without equivalent progress in sign-language education, interpreting, transcription or communication-quality standards. The EU policy architecture is therefore normatively compatible but operationally fragmented. The study argues that meaningful educational access depends on policy coherence linking linguistic rights, communication support, accessible digital environments, professional capacity, resources and accountability in practice.

Keywords: deaf and hard-of-hearing learners; European Union policy; meaningful educational access; inclusive education; policy coherence

1. Introduction

1.1. The European Shift towards Rights-Based Inclusive Education

European disability and education policy has progressively moved beyond approaches centered primarily on social integration and equal opportunity towards a rights-based understanding of inclusion. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) establishes education, accessibility, non-discrimination and reasonable accommodation as interdependent obligations, while its interpretation of Article 24 frames inclusive education as a systemic transformation of culture, policy and practice rather than the placement of individual learners in unchanged institutions (United Nations, 2006; Committee on the Rights of Persons with Disabilities, 2016). Within the European Union, this orientation is reflected in the transition from the European Disability Strategy 2010-2020 to the Strategy for the Rights of Persons with Disabilities 2021-2030 and its subsequent enhancement, alongside education and digital-policy frameworks that emphasize equity, inclusion, lifelong learning and accessible digital environments (European Commission, 2010, 2020a, 2020b, 2021, 2026; Council of the European Union, 2021a, 2021b). Nevertheless, increasingly comprehensive commitments to inclusion do not necessarily specify the distinct conditions through which different groups of learners can understand, communicate, participate and achieve on an equal basis.

1.2. Why Deaf and Hard-of-Hearing Learners Require a Specific Policy Lens

Deaf and hard-of-hearing (D/HH) learners cannot be adequately analyzed solely within a general category of disability because their educational participation is shaped by the intersection of disability, language, communication and, for some, cultural identity.

Depending on individual language histories, preferences and educational contexts, meaningful access may require different but non-equivalent forms of provision. These may include direct linguistic access through a sign language as the language of instruction or through sign-bilingual education; mediated communication access through qualified sign-language interpreting; written-language access through accurate captioning or real-time transcription; visually accessible pedagogy and educational materials; and, where appropriate, hearing and assistive technologies. Such arrangements may operate in combination, but one form of provision should not be presumed to replace another.

The UNCRPD expressly recognizes sign languages, the linguistic identity of the Deaf community and education through the most appropriate languages, modes and means of communication (United Nations, 2006). Research likewise demonstrates that D/HH learners constitute a heterogeneous population whose communication profiles cannot be reduced to a single educational model (Knoors & Marschark, 2012; Spencer *et al.*, 2018). Interpretation and transcription are not interchangeable technical additions. The effectiveness of interpreting depends partly on professional expertise, subject knowledge and responsiveness to learners' communication preferences, while the effectiveness and continuity of communication support more broadly also depend on platform design, institutional coordination and integration into teaching procedures (Napier & Barker, 2004; Tannenbaum-Baruchi *et al.*, 2025). Moreover, access can fail even where support formally exists: delayed captions, unavailable interpreters, inaccessible recordings or staff unfamiliarity with visual communication can interrupt participation and transfer responsibility for remedying institutional barriers back to the learner. A specific policy lens is therefore necessary to assess whether general provisions on inclusion are translated into multiple, reliable and individually appropriate routes to linguistic, communicative, academic and social participation.

1.3. Research Problem and Literature Gap

Existing scholarship provides substantial knowledge about particular dimensions of D/HH education. One strand examines sign-language-based and bilingual education, including the need to align language planning with the increasing diversity of deaf children and their families (Knoors & Marschark, 2012). A related legal and human-rights literature analyses the status of sign language, linguistic identity and the interpretation of Article 24 of the UNCRPD (Murray *et al.*, 2018). Other studies investigate learners' communication profiles and educational experiences, showing that access is shaped by varied combinations of signing, spoken and written language, interpretation, transcription, hearing technologies and institutional support (Spencer *et al.*, 2018; Tannenbaum-Baruchi *et al.*, 2025). Research on higher education has additionally identified the importance of interpreter expertise, service continuity and institutional responsibility rather than reliance on learners to coordinate their own access (Napier & Barker, 2004; Tannenbaum-Baruchi *et al.*, 2025).

This literature is informative but remains distributed across educational sectors, national or institutional settings, individual support practices and distinct rights questions. National policy analyses have also examined how UNCRPD commitments concerning bilingual education, vocational provision and digital inclusion are translated into domestic frameworks, identifying persistent gaps between formal recognition and implementation in practice (Vangeli *et al.*, 2025). However, such studies do not examine whether the European Union's disability, education, digital-transformation and accessibility frameworks themselves operate together as a coherent cross-sectoral policy architecture for D/HH learners.

The central issue is therefore not simply whether disability, deafness, sign language or accessibility appears in individual documents. It is whether general rights and inclusion commitments are connected across policy domains and translated into sufficiently specific, operational and accountable provisions for linguistic access, communication support, reasonable accommodation, accessible digital learning and institutional capacity. A comparative analysis across the 2010-2020 and 2021-2030 periods is also needed to determine whether policy development has increased not only the visibility of inclusion, but also the precision and implementation orientation of the conditions required for meaningful educational participation.

1.4. Aim and Research Questions

This article aims to critically examine how European Union disability, education and accessibility policy frameworks address the conditions required for the equitable and meaningful participation of D/HH learners. It assesses the extent to which general commitments to inclusive education are translated into coherent and operational provisions concerning linguistic access, communication support, reasonable accommodation, accessible digital learning, institutional capacity and accountability. The study therefore assesses whether EU policy establishes the conditions intended to enable meaningful access; it does not evaluate whether such access is achieved in practice or experienced by learners.

RQ1. How are D/HH learners and their educational rights represented across European Union disability, education and accessibility policy frameworks?

RQ2. To what extent are general commitments to inclusive education translated into specific provisions concerning linguistic access, communication support, reasonable accommodation and accessible digital learning?

RQ3. How coherent are the relevant provisions across the different domains of European Union policy, and what gaps, inconsistencies or areas of fragmentation can be identified?

RQ4. What changes can be observed between the 2010-2020 and 2021-2030 strategic periods in the specificity, scope and implementation orientation of European Union policy concerning D/HH learners?

By connecting these questions, the study contributes a cross-sectoral account of how meaningful access is constructed within EU policy. Its original contribution lies in treating meaningful educational access not as the product of any single policy field, but as an outcome of coherence across the EU's disability, education, digital and accessibility frameworks. The following sections establish the analytical framework, map the relevant policy architecture, explain the comparative qualitative methodology, and present the findings, discussion and policy implications.

2. Conceptual and Analytical Framework: From Inclusion to Meaningful Access

2.1. Terminology and the Heterogeneity of Deaf and Hard-of-Hearing Learners

Terminology in this field is neither neutral nor fully standardized. In this article, *deaf* refers, where analytically necessary, to audiological status, whereas *Deaf* denotes identification with a linguistic and cultural community organized around sign language and shared social experience (Ladd, 2003). This distinction is used as an analytical convention rather than as a rigid binary classification of identity. *Hard of hearing* refers to people who identify with that term and may use spoken or signed language, captions, hearing technologies, or combinations of these resources. These categories overlap but are not interchangeable, and neither audiological status nor technology use determines language, identity, or educational preference. The expression *sign-language users* is therefore used only when language use is relevant; it is not synonymous with either Deaf people or the wider population with hearing loss.

The collective abbreviation D/HH is used in this article when referring jointly to Deaf and hard-of-hearing learners across school education, vocational education and training, higher education, adult education, and lifelong learning. The abbreviation functions solely as analytical shorthand and does not imply a unified European identity or a homogeneous policy category. The policy significance of access also varies across educational stages: for children in early and compulsory education, linguistic access may concern language acquisition and development as well as access to educational content, whereas for older learners with an established language repertoire it may more often concern language of instruction, mediated communication access and specific accommodations.

Learners may use a sign language, one or more spoken and written languages, or bimodal bilingual repertoires involving signed and spoken/written languages. Depending on context, they may also use interpretation, captioning, real-time transcription, visually accessible teaching, hearing aids, cochlear implants or assistive listening systems. Heterogeneity may additionally encompass language history and age of acquisition, multilingual or migration background, additional disabilities, socioeconomic circumstances and prior educational experience, although these dimensions fall beyond the study's specific analytical scope. Such diversity is educationally consequential and challenges policies premised on a uniform

communication pathway (Knoors & Marschark, 2012; Spencer *et al.*, 2018). Heterogeneity consequently constitutes an analytical criterion: EU policy is assessed according to whether it recognizes multiple, individually appropriate routes to participation rather than implying a single standard response.

2.2. The Rights-Based and Social-Relational Approaches to Disability

The analysis rejects an exclusively medical understanding that locates educational difficulty within an individual impairment and treats remediation or personal adaptation as the principal response. Social and social-relational approaches instead direct attention to disabling relations: inaccessible communication, institutional routines, technologies, curricula, attitudes, and resource arrangements can restrict participation, while impairment and its embodied effects remain part of individual experience (Thomas, 2004). The UNCRPD similarly describes disability as arising through interaction with barriers and establishes persons with disabilities as rights holders rather than recipients of discretionary welfare (United Nations, 2006).

The human-rights model builds upon this shift by linking barrier removal to dignity, autonomy, substantive equality, non-discrimination, accessibility, participation, and enforceable obligations (Degener, 2016). For policy analysis, the distinction is operational rather than merely theoretical. Documents are examined for whether they recognize identifiable rights, assign responsibilities to public authorities and educational institutions, require anticipatory accessibility and individual reasonable accommodation, and provide mechanisms for implementation and redress. A rights-based orientation is strongest where responsibility is transferred from learners, who might otherwise have to negotiate access repeatedly, to systems required to identify and remove barriers. General declarations of inclusion are therefore insufficient unless accompanied by institutional duties, resources, professional capacity, and accountability.

2.3. The Linguistic-Cultural Dimension of Deaf Education

Deaf education occupies a distinctive position because disability, language, culture, and communication rights intersect. The UNCRPD defines language as including spoken and signed languages and requires facilitation of sign-language learning, promotion of the linguistic identity of the Deaf community, education through the most appropriate languages and modes of communication for the individual, and recognition of sign languages and Deaf culture (United Nations, 2006). Sign language must consequently not be reduced to a compensatory technique equivalent to a device or ancillary service. Sign languages are fully fledged natural languages and, for many Deaf learners, may constitute a primary or preferred language, a medium of instruction and interaction, and a basis of cultural affiliation. Treating it solely as an accommodation can obscure questions of language acquisition, educational quality, peer communication, and the availability of teachers who are qualified in sign language.

At the same time, a linguistic-cultural approach should not replace a medical generalization with a cultural one. Not all D/HH learners identify with Deaf culture or use sign language, while sign-language users themselves may differ in fluency, age of acquisition, multilingual background, and educational history. The legal significance of linguistic identity must therefore coexist with individual choice and multiple forms of access (Knoors & Marschark, 2012; Murray *et al.*, 2018). The analytical question is not whether policy endorses one communication philosophy, but whether it protects sign-language rights and direct linguistic access while also ensuring appropriate and reliable communication accommodations and technological supports, without presuming that these forms of provision are interchangeable.

2.4. Meaningful Access beyond Formal Placement

The central concept of *meaningful access* distinguishes educational presence from effective and equitable participation. The Committee on the Rights of Persons with Disabilities differentiates inclusion from integration: placing a learner in a mainstream institution without changing its structures, curriculum, pedagogy, or communication environment does not itself constitute inclusion (Committee on the Rights of Persons with Disabilities, 2016). In this study, meaningful access denotes the practical capacity to understand educational content; communicate and interact in real time; participate in individual, group, curricular, and social activities; complete assessment without avoidable communication barriers; exercise choice and autonomy; and experience academic and social development, including a sense of belonging.

In this study, meaningful access functions as the integrative analytical framework linking linguistic rights and communication support with accessible educational environments, institutional capacity and accountability. Meaningful access combines systemic and individual dimensions. Accessibility and universal design require environments, information, technologies, and services to be planned for diverse users, whereas reasonable accommodation responds to the requirements of a particular learner; the two obligations are complementary rather than substitutable (Committee on the Rights of Persons with Disabilities, 2014, 2016). For D/HH learners, formal availability of interpretation, captions, transcription, or assistive technology is therefore not enough. Provision must also be timely, accurate, continuous, compatible with the learning task, and responsive to communication preferences. Learner choice is meaningful only where multiple accessible and adequately resourced options are genuinely available, rather than being constrained by the absence of services or viable alternatives. Empirical evidence shows that nominal accommodations may remain fragmented or unreliable and can require students to coordinate interpreters, transcribers, lecturers, and technologies themselves (Tannenbaum-Baruchi *et al.*, 2025). Policy is thus assessed not only for technical compliance or the mention of support, but for whether its provisions establish credible policy conditions for comprehension, interaction, equitable assessment, autonomy and belonging.

2.5. Policy Coherence as an Analytical Lens

Policy coherence concerns the extent to which objectives, concepts, instruments, responsibilities, resources, and accountability arrangements reinforce rather than undermine one another across a policy system. Coherence is more demanding than the absence of explicit contradiction: fragmented policies may share broad goals while leaving critical links between rights, measures, implementation, and monitoring unspecified (Nilsson *et al.*, 2012; Cejudo & Michel, 2017). In this article, coherence is evaluated through three related dimensions.

Vertical coherence concerns alignment between the UNCRPD's normative requirements and the principles, objectives, and operational provisions of EU-level disability, education, digital, and accessibility policy.

Horizontal coherence concerns compatibility and complementarity across these policy domains, including whether general inclusion commitments connect with provisions on sign languages, communication support, reasonable accommodation, digital accessibility, institutional capacity, funding, participation, and accountability.

Temporal coherence, used here as a study-specific comparative dimension, examines continuity and change between the 2010-2020 and 2021-2030 periods, including whether later frameworks retain earlier commitments, address identified gaps, and increase specificity or implementation orientation. These dimensions guide comparison across documents of different legal status. Coherence is therefore not inferred from identical wording, but from whether binding law, strategies, recommendations, and standards collectively establish a consistent and operational pathway from recognition of rights to meaningful educational access.

3. The European Union Policy Architecture

3.1. European Union Competence and Governance in Education

Education in the European Union is governed by limited competences. Under Articles 6, 165 and 166 of the Treaty on the Functioning of the European Union (TFEU), Union action may support, coordinate and supplement that of the Member States, while responsibility for teaching content and the organization of education and vocational-training systems remains primarily national and harmonization is excluded. EU education policy therefore operates largely through strategic frameworks, Council resolutions and recommendations, the open method of coordination, mutual learning, common indicators, monitoring and funding. These instruments shape priorities and resources without replacing domestic authority. The architecture is nevertheless not exclusively non-binding. Legislation adopted under competences concerning non-discrimination, the internal market, audiovisual media and accessibility can affect educational institutions and services. Distinguishing these instruments is essential: strategies express shared priorities, whereas directives create obligations within their scope and require national transposition (European Union, 2012; Council of the European Union, 2021b).

3.2. International and European Rights Foundations

The normative reference is the UNCRPD, concluded by the European Community through Council Decision 2010/48/EC as a mixed agreement. Within Union competence, the Convention requires non-discrimination, accessibility, reasonable accommodation and the active involvement of persons with disabilities in policymaking. Its provisions are particularly relevant to D/HH learners: the Convention's definition of communication includes signed languages; Article 9 addresses accessibility and identifies professional sign-language interpreters as a form of live assistance; Article 21 requires accessible information and communication and the acceptance and facilitation of sign languages; Article 24 requires inclusive education, individual support, sign-language learning, promotion of Deaf linguistic identity, appropriate communication modes, qualified staff and access to tertiary, vocational and lifelong learning; and Article 30 recognizes sign languages and Deaf culture (United Nations, 2006; Council of the European Union, 2010). TFEU Articles 10 and 19 provide a basis for combating disability discrimination, while Charter Articles 14, 21, 22 and 26 protect education, non-discrimination, linguistic diversity and participation within its field of application (European Union, 2012, 2016). Directive 2000/78/EC additionally prohibits disability discrimination within its employment and occupation scope, including access to vocational guidance and vocational training, and imposes reasonable-accommodation duties on employers. It does not, however, establish a general right to education or a comprehensive reasonable-accommodation duty covering all educational providers (Council of the European Union, 2000).

3.3. European Union Disability Strategies

The disability-strategy layer organizes horizontal EU action across policy fields. The European Disability Strategy 2010-2020 pursued a "barrier-free Europe" through eight areas of action, including accessibility, participation, equality, employment, education and training, while relying on mainstreaming, EU instruments, funding, awareness-raising and data collection (European Commission, 2010). The Strategy for the Rights of Persons with Disabilities 2021-2030 more explicitly situates EU action within the UNCRPD and the "Union of Equality." It combines Commission commitments and flagship initiatives with calls to Member States and gives greater prominence to accessibility, independent living, participation, education and skills, implementation, stakeholder engagement and monitoring through mechanisms such as the Disability Platform and a strategy dashboard (European Commission, 2021). The 2026 enhancement does not replace the 2021 strategy; it updates delivery through 2030, including a flagship initiative on disability-inclusive lifelong learning and renewed action on digital accessibility, assistive technologies and monitoring (European Commission, 2026). These communications are strategic rather than legislative instruments, but they provide the central temporal framework for comparing EU priorities across the two periods.

3.4. European Education and Training Policy Frameworks

The education-policy layer is constructed mainly through cooperation and soft-law instruments. The Council Resolution establishing the strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030) uses the open method of coordination and identifies quality, equity, inclusion and success for all as its first strategic priority (Council of the European Union, 2021b). The Commission communication on achieving the European Education Area by 2025 places inclusion and gender equality among its principal dimensions, while the Council conclusions on equity and inclusion and the Recommendation on Pathways to School Success develop common expectations concerning disadvantage, participation and attainment (European Commission, 2020b; Council of the European Union, 2021a, 2022). The Digital Education Action Plan 2021-2027 adds a dimension through priorities concerning a high-performing digital education ecosystem and digital competences, including accessible technologies, environments and content (European Commission, 2020a). Related vocational and lifelong-learning instruments extend the architecture beyond schooling. These documents are included because they shape the settings in which D/HH learners participate, although communications, resolutions, conclusions and recommendations lack the binding force of directives.

3.5. Accessibility, Electronic Communications and Digital Policy Frameworks

The accessibility layer combines binding law with technical standardization. Directive (EU) 2016/2102 requires public-sector websites and mobile applications to be perceivable, operable, understandable and robust; however, Member States may exclude school, kindergarten and nursery websites except essential online administrative content (European Parliament & Council of the European Union, 2016).

Directive (EU) 2018/1808 requires audiovisual media services to become progressively more accessible; relevant means include sign language, subtitling for D/HH viewers, spoken subtitles and audio description (European Parliament & Council of the European Union, 2018a). Directive (EU) 2018/1972, establishing the European Electronic Communications Code, requires measures supporting equivalent access and choice for end-users with disabilities within the electronic-communications sector. Its relevant provisions concern accessible information, consultation with end-users with disabilities, emergency communications and, where appropriate, the availability and affordability of total-conversation and relay services (European Parliament & Council of the European Union, 2018b).

The European Accessibility Act complements this framework by harmonizing accessibility requirements for products and services, including computers, e-readers, e-books, electronic communications, e-commerce and access to audiovisual media services, rather than education itself (European Parliament & Council of the European Union, 2019). EN 301 549 V3.2.1 (2021) provides a technical benchmark for Information and Communication Technologies (ICT) accessibility and procurement, but is not legislation

(European Committee for Standardization *et al.*, 2021). Together, these instruments frame access to platforms, documents, multimedia and communication technologies integral to education, although they do not establish comprehensive requirements for their pedagogical use.

4. Methodology

4.1. Research Design

This study employed comparative qualitative policy analysis to examine how rights and access conditions for D/HH learners are constructed across European Union policy fields and over time. Qualitative document analysis was appropriate because legal and institutional texts define policy problems, responsibilities, and available instruments (Bowen, 2009). Directed qualitative content analysis translated the UNCRPD and the conceptual framework developed in Section 2 into initial categories, while inductive coding captured provisions and relationships not adequately represented by the predetermined scheme (Hsieh & Shannon, 2005; Schreier, 2012). The design combined within-document interpretation with cross-sectoral comparison among disability, education, digital, and accessibility policies and temporal comparison between the 2010-2020 and 2021-2030 periods. Policy coherence was examined as alignment among norms, objectives, measures, institutional responsibilities, and monitoring arrangements rather than as similarity of wording alone (Cejudo & Michel, 2017). Documents were not treated as equivalent policy instruments or assessed against identical expectations; each was interpreted according to its legal force, institutional function, scope and addressees, while coherence was evaluated through the contribution of the corpus as a whole to the wider policy architecture.

4.2. Document Corpus and Selection Criteria

The final corpus comprised 24 English-language documents: 19 EU legal, policy, technical, and monitoring texts and five UNCRPD instruments used as normative and interpretive benchmarks. The corpus was selected to encompass the principal legal, strategic, technical and interpretive instruments that collectively shape the EU-level policy environment relevant to D/HH learners. Candidate documents were identified through purposive searches of official EU, UN and European standardization repositories, guided by the policy domains and analytical concepts specified in the research questions and conceptual framework. The corpus was considered adequate when it covered the principal normative, strategic, legislative, technical and monitoring instruments required to address each research question across the relevant policy domains; adequacy therefore referred to analytical coverage rather than exhaustive retrieval.

The principal temporal window began in 2010; earlier instruments were retained only when they remained legally operative and directly structured the rights framework.

The corpus covered foundational law and UNCRPD interpretation (Council of the European Union, 2000, 2010; United Nations, 2006; European Union, 2012, 2016; Committee on the Rights of Persons with Disabilities, 2014, 2016, 2018a, 2018b); disability and sign-language policy (European Commission, 2010, 2021, 2026; European Parliament, 2016; Quinlivan & O'Mahony, 2025); education and digital education (European Commission, 2020a, 2020b; Council of the European Union, 2021a, 2021b, 2022); and ICT, electronic-communications and audiovisual accessibility (European Parliament & Council of the European Union, 2016, 2018a, 2018b, 2019; European Committee for Standardization *et al.*, 2021).

Inclusion required substantive rights, objectives, recommendations, technical requirements, measures, or monitoring arrangements relevant to the study at the EU level. National and institution-specific policies, press releases, short notices, and documents lacking substantive relevance were excluded. Table 1 summarizes the corpus by functional policy layer, legal or institutional status, and analytical role.

Table 1: Policy Corpus by Functional Layer

Policy layer	**Principal instruments**	**Legal or institutional status**	**Function in the analysis**
Normative rights framework	UNCRPD; General Comments Nos. 2, 4, 6 and 7; Charter	Binding international obligations and EU primary law; authoritative non-binding interpretive guidance	Establishes binding rights and duties and provides authoritative interpretive benchmarks
EU competence and non-discrimination	TFEU; Directive 2000/78/EC; Decision 2010/48/EC	Primary EU law (TFEU) and binding secondary EU law (Directive 2000/78/EC and Decision 2010/48/EC)	Defines EU competence and enforceable duties within scope
Disability strategy	Disability Strategies 2010–2020 and 2021–2030; 2026 enhancement	Non-binding Commission strategies	Frames disability priorities across the two periods
Education and training	European Education Area, strategic framework, equity and school-success instruments	Communications and Council soft law	Defines mainstream inclusion and educational cooperation
Digital, electronic-communications and audiovisual accessibility	Directives 2016/2102, 2018/1808, 2018/1972 and 2019/882	Binding directives	Provides operational accessibility and equivalent-access requirements for public-sector websites, electronic communications, audiovisual media, products

			and services within defined scopes
Technical and monitoring instruments	EN 301 549; Parliament resolution; implementation analysis	Standard, resolution and analytical monitoring text	Supplies technical detail and Deaf-specific or implementation-oriented guidance

4.3. Unit of Analysis

The unit of analysis was a discrete meaning-bearing provision: an article, recital, paragraph, sentence, annex entry, target, or technical requirement expressing a principle, right, obligation, objective, recommendation, measure, implementation mechanism, indicator, monitoring process, or target-group reference. Units were coded in their textual and institutional context rather than as isolated keywords (Schreier, 2012). Analysis addressed both explicit content and the relationship between general commitments and group-specific or operational provisions. The absence of terms such as *Deaf*, *hard of hearing*, *sign language*, or *captioning* was not treated automatically as policy failure; it was interpreted in relation to each document's purpose, scope, legal status, addressees, and complementary instruments.

4.4. Analytical Coding Framework

The initial codebook was derived principally from UNCRPD Articles 4, 5, 9, 21, 24, and 30 and General Comments Nos. 2, 4, 6, and 7. Categories were defined through inclusion and exclusion rules and refined iteratively during coding (United Nations, 2006; Committee on the Rights of Persons with Disabilities, 2014, 2016, 2018a, 2018b). Table 2 provides an overview of the six analytical dimensions, the core policy question associated with each dimension, and the principal indicators used in coding.

Table 2: Analytical Dimensions of Meaningful Access

Analytical dimension	Core policy question	Main indicators
Recognition and representation	Are D/HH learners explicitly and heterogeneously represented?	Naming, linguistic identity, communication diversity, learner choice
Linguistic and educational access	Are language rights translated into educational provision?	Sign-language learning, medium of instruction, bilingual provision, accessible curriculum
Communication access and accommodation	Are reliable individual communication routes guaranteed?	Interpretation, captions, transcription, timeliness, continuity, quality
Digital and audiovisual accessibility	Can digital environments and materials be used on an equivalent basis?	Accessible platforms, multimedia, real-time text, sign-language video, interoperability
Institutional and professional capacity	Are institutions equipped to implement the provisions?	Qualified personnel, support services, training, funding, procurement

Participation and accountability	Can affected learners shape and challenge policy implementation?	Consultation, indicators, data, monitoring, enforcement and redress

4.4.1. Recognition and Representation

This axis captured references to D/HH people, sensory disability, sign-language users, linguistic-cultural identity, and heterogeneity. It also recorded whether learners appeared as rights holders, vulnerable beneficiaries, or an undifferentiated disability subgroup.

4.4.2. Linguistic and Educational Access

Codes covered sign languages, sign-bilingual education, explicitly identified bimodal bilingual provision, language development, curriculum access, languages of instruction and assessment, and appropriately formatted materials. They distinguished sign language as a language and educational medium from its treatment solely as an accommodation.

4.4.3. Communication Accessibility and Reasonable Accommodation

This category addressed interpretation, captioning, live transcription, note-taking, multiple communication modes, reasonable accommodation, and individual choice. Coding also considered whether support was framed as a right or duty and specified in terms of timeliness, continuity, quality, and context. Throughout coding, direct linguistic access through a sign language, mediated communication access through interpreting, written-language access through captioning or transcription, and access supported by hearing or assistive technologies were treated as analytically distinct, potentially complementary and non-equivalent forms of provision.

4.4.4. Digital and Audiovisual Accessibility

Codes included accessible digital materials and platforms, captioned audiovisual content, synchronous and asynchronous learning, speech-to-text and assistive technologies, interoperability, and universal or multimodal design. General ICT accessibility was distinguished from education-specific provision.

4.4.5. Institutional and Professional Capacity

This axis examined staff education, sign-language competence, interpreter qualifications, accessibility services, technical support, funding, procurement, and professional collaboration. It also identified whether implementation rested on defined institutional capacity or remained an unassigned aspiration.

4.4.6. Participation, Monitoring and Accountability

Codes addressed consultation, co-design, disaggregated data, indicators, deadlines, responsible bodies, evaluation, enforcement, and redress. Inductive codes captured

generic inclusion language, fragmented responsibility, learner-borne coordination, and missing links between commitments and implementation.

4.5. Data Analysis Procedure

Analysis proceeded in eight stages. Documents were collected, authenticated, classified by legal or policy status, and entered into a metadata matrix. A first reading established each text's purpose, scope, addressees, and institutional position. Directed codes were then applied to relevant meaning units, followed by inductive coding of recurrent formulations, omissions, tensions, and unanticipated provisions (Hsieh & Shannon, 2005; Saldaña, 2021). Coding was undertaken by one author. Ambiguous or overlapping units were revisited against the full source passage, the codebook and the document's legal and institutional context, and the final decision was recorded in the decision log.

A within-document profile was prepared for each text, preserving its legal force and policy function. Coding decisions and document profiles were repeatedly reviewed against the original source passages, the document's purpose and scope, and the definitions contained in the codebook. Profiles were then compared across disability, education and training, digital education, and accessibility to determine whether general principles were translated into specific measures. A temporal matrix compared the two strategic periods in terms of recognition, specificity, scope, implementation orientation, and accountability. Related codes were finally synthesized into the thematic patterns reported in Section 5. Frequencies were descriptive only; interpretive weight depended on context, precision, legal status, and relationships among documents.

4.6. Analytical Rigor, Reflexivity and Limitations

Rigor was supported through a documented selection protocol, a versioned codebook, preservation of source passages, a decision log, and systematic attention to confirming, contradictory, and exceptional provisions (Bowen, 2009; Nowell *et al.*, 2017). Coding decisions were repeatedly reviewed against document purpose, scope and legal status to avoid equating silence with non-protection or soft-law commitments with binding obligations. Because the rights-based framework foregrounded institutional responsibility and meaningful access, inductive coding and attention to alternative formulations were used to limit confirmation bias. Because coding was conducted by a single author, the study does not claim intercoder reliability or independent replication of the coding. Its trustworthiness rests instead on a documented and traceable interpretive process, including preservation of source passages, iterative codebook refinement and systematic comparison of confirming, contradictory and exceptional provisions. Document analysis identifies policy design and cross-policy coherence; it does not assess the extent of implementation across Member States or the effects of these policies on the educational outcomes and lived experiences of D/HH learners.

5. Findings

5.1. Visibility and Conceptualization of Deaf and Hard-of-Hearing Learners

Explicit recognition was concentrated in a limited group of instruments. Deaf and hard-of-hearing people were named most consistently in the UNCRPD and its interpretive General Comments, the European Parliament resolution on sign languages and professional interpreters, and legislation or standards addressing audiovisual and ICT accessibility. The principal EU education and training frameworks did not identify Deaf or hard-of-hearing learners as a distinct group. They referred instead to persons or learners with disabilities, special educational needs, vulnerable groups, or learners requiring additional support (European Commission, 2020a, 2020b; Council of the European Union, 2021a, 2021b, 2022).

Conceptualization varied by policy field. The UNCRPD combined sensory-disability recognition with communication choice, sign languages, Deaf linguistic identity, and cultural rights (United Nations, 2006). The Parliament resolution adopted the clearest linguistic-cultural framing, distinguishing Deaf sign-language users while also naming deafblind and hard-of-hearing people and recognizing subtitling and speech-to-text as necessary for people who do not use sign language (European Parliament, 2016). Accessibility legislation generally approached the population functionally, through barriers to hearing, communication, media access, or product use (European Parliament & Council of the European Union, 2018a, 2019). EU disability strategies acknowledged sign-language-related barriers in selected contexts, but their education provisions remained organized around disability as a broad category (European Commission, 2010, 2021, 2026). Thus, heterogeneity was recognizable across the combined corpus, but rarely articulated within a single education-policy instrument.

5.2. Linguistic Rights, Sign Language and Bilingual Education

The strongest linguistic guarantees originated in the UNCRPD. Article 24 requires facilitation of sign-language learning, promotion of the linguistic identity of the Deaf community, education in the most appropriate languages and modes of communication for the individual, and employment of teachers qualified in sign language. Article 30 separately recognizes sign languages and Deaf culture as elements of cultural and linguistic identity (United Nations, 2006). General Comment No. 4 developed these provisions by requiring opportunities for D/HH learners to learn sign language, recognition of Deaf linguistic identity, access to appropriate communication technologies and captioning, and qualified sign-language personnel within inclusive settings (Committee on the Rights of Persons with Disabilities, 2016).

At EU level, the 2016 Parliament resolution provided the most detailed translation of these principles. It treated national and regional sign languages as fully fledged natural languages; called for sign-language learning in preschool services, schools, and curricula; supported bilingual inclusive education; and identified competent teaching staff,

qualified interpreters, and sign-bilingual materials as conditions of educational achievement (European Parliament, 2016). These provisions appeared in a non-binding resolution rather than in the central education-cooperation instruments.

The latter endorsed inclusive education, individualized support, accessible settings, assistive technologies, and compliance with Article 24 of the UNCRPD, but did not specify sign language as a language of instruction, sign-bilingual curricula, Deaf linguistic identity, or sign-language competence among teachers (European Commission, 2020b; Council of the European Union, 2021a, 2021b, 2022). The Digital Education Action Plan similarly addressed accessible tools, assistive technologies, and inclusive digital content without incorporating sign-language pedagogy or bilingual digital learning as explicit policy components (European Commission, 2020a). The 2026 enhancement introduced disability-inclusive lifelong learning and future guidance on curricula, higher education accessibility, support services, and reasonable accommodation, yet retained a generic disability framing (European Commission, 2026). Linguistic rights were therefore normatively clear but only weakly embedded in mainstream EU education policy.

5.3. Communication Access and Reasonable Accommodation

The corpus distinguished two routes to communication access. The UNCRPD establishes anticipatory accessibility obligations and an individual right to reasonable accommodation, defines communication broadly, and requires acceptance of communication methods chosen by persons with disabilities. It also identifies professional sign-language interpreters as a form of live assistance (United Nations, 2006). General Comments Nos. 2 and 4 clarify that accessibility applies systematically and progressively to groups, whereas reasonable accommodation is immediately applicable in individual cases; one obligation does not displace the other (Committee on the Rights of Persons with Disabilities, 2014, 2016).

The Parliament resolution operationalized this distinction more specifically for D/HH people. It recognized that interpreting may function either as accessibility or as reasonable accommodation, required equal information through interpretation, subtitling, speech-to-text, or alternative communication, and linked quality to professional qualifications, continuous development, Deaf-community involvement, and sufficient resources. For education and training, it explicitly included professional interpreting within reasonable accommodation and opposed requiring mobile learners to arrange interpreting themselves (European Parliament, 2016).

This specificity was not reproduced across the education-policy layer. The 2021 disability strategy referred to insufficient accessibility, reasonable accommodation, and learner support in mainstream vocational education and called for stronger compliance with Article 24, but did not define an educational service package involving interpretation, real-time transcription, captioning, note-taking, or learner-selected communication modes (European Commission, 2021). Council education texts referred to individualized support and accessible learning environments, yet remained silent on

the communication services through which these principles would be realized for D/HH learners (Council of the European Union, 2021a, 2022). EU law therefore provided a reasonable-accommodation duty in employment, alongside non-discrimination protection in access to vocational guidance and training within the scope of Directive 2000/78/EC. It did not establish a comprehensive EU-level entitlement to communication support across educational sectors (Council of the European Union, 2000).

5.4. Digital Education and Audiovisual Accessibility

Digital policy contained operational requirements dispersed across instruments with different scopes. The Digital Education Action Plan recognized that learners with disabilities require fully accessible tools and identified barriers involving inaccessible technologies and materials, limited assistive technology, inadequate technical support, and insufficient teacher competence. Its actions promoted accessible platforms, assistive technologies, inclusive content, and capacity development, but did not specify captions, real-time transcription, sign-language video, or accessible synchronous teaching (European Commission, 2020a).

Binding accessibility legislation supplied part of this technical detail. Directive (EU) 2016/2102 requires public-sector websites and mobile applications to be perceivable, operable, understandable, and robust and establishes accessibility statements, feedback, monitoring, and enforcement. Its educational reach is restricted because Member States may exclude school, kindergarten, and nursery websites except essential online administrative functions; live time-based media are also excluded (European Parliament & Council of the European Union, 2016).

Directive (EU) 2018/1808 requires audiovisual media services to become progressively more accessible and identifies sign language and subtitling for D/HH viewers among the relevant access services (European Parliament & Council of the European Union, 2018a). Directive (EU) 2018/1972 adds a user-rights dimension by requiring equivalent access and choice for end-users with disabilities in electronic communications. It also provides for accessible information and consultation and, where appropriate, measures supporting the availability and affordability of total-conversation and relay services. These provisions establish relevant communications infrastructure but do not regulate its educational use or create an entitlement to interpretation, transcription or accessible synchronous teaching within educational institutions (European Parliament & Council of the European Union, 2018b). The European Accessibility Act complements this framework through accessibility requirements relevant to electronic communications, audiovisual-media access services, e-books, computers and consumer digital services (European Parliament & Council of the European Union, 2019).

EN 301 549 further specifies caption display, synchronization, preservation and customization; real-time text and concurrent voice and text; visual indicators of audio activity; and video parameters supporting sign language and lip-reading (European

Committee for Standardization *et al.*, 2021). These legal and technical provisions can support educational platforms, communication systems and resources, but do not allocate responsibility for accurate captions, live transcription, interpreter integration or pedagogical accessibility within educational institutions. Electronic-communications and technical accessibility were therefore more operationally specific than digital-education governance, but remained only indirectly connected to teaching, learning and institutional support arrangements.

5.5. Institutional Capacity and Professional Support

Institutional capacity was recognized but unevenly specified. The UNCRPD requires teachers qualified in sign language and training for professionals and staff at all educational levels in appropriate communication formats, techniques, and materials (United Nations, 2006). General Comment No. 4 presents supported and appropriately trained teachers, accessible counselling and support services, and sustained resources as core features of inclusive education (Committee on the Rights of Persons with Disabilities, 2016). The Parliament resolution adds professional standards for interpreters, higher-level education, continuous professional development, Deaf-community expertise, and sufficient resources to train and employ personnel. It also identifies shortages of qualified interpreters and sign-bilingual materials as structural constraints (European Parliament, 2016).

The EU disability and education frameworks recognized broader capacity problems. The 2021 strategy committed the Commission to supporting teacher-education systems, addressing shortages in special-needs education, strengthening educators' capacity to manage diversity, and providing training on inclusive education, accessibility, and reasonable accommodation (European Commission, 2021). The Digital Education Action Plan connected accessible learning with teacher competence, technical support, assistive technologies, and accessible content (European Commission, 2020a). The 2026 enhancement expanded the implementation agenda through higher-education support services, professional accessibility training, accessible digital infrastructure, and disability-inclusive mutual learning (European Commission, 2026).

Nevertheless, the mainstream frameworks did not establish EU-level expectations for the availability, qualifications, continuity, or funding of educational sign-language interpreters, captioners, or real-time transcribers. Funding instruments enabled national reform, mobility, infrastructure, and inclusion, but were not tied to defined communication-service standards. Rights were linked to organizational infrastructure, but Deaf-specific workforce arrangements remained largely national or institutional.

5.6. Participation, Monitoring and Accountability

Participation obligations were strongest under the UNCRPD. Article 4(3) requires close consultation with and active involvement of persons with disabilities through their representative organizations. General Comment No. 7 defines participation as early,

accessible, adequately resourced, and consequential, requiring accessible information, sign-language interpretation, captioning, reasonable accommodation, permanent consultation mechanisms, timelines, and identifiable responsibilities (Committee on the Rights of Persons with Disabilities, 2018b). The Parliament resolution similarly called for Deaf-community expertise in interpreting standards and accessible public consultations (European Parliament, 2016). Within the electronic-communications field, Directive (EU) 2018/1972 additionally requires consultation mechanisms that take account of the interests of end-users with disabilities in relation to their rights and equivalent access (European Parliament & Council of the European Union, 2018b). This participation requirement is sector-specific, however, and is not reproduced as an equivalent obligation to involve D/HH learners in education-policy design.

The 2021 strategy strengthened EU-level governance by establishing the Disability Platform, structured dialogue with representative organizations, a monitoring framework, a dashboard, new indicators, and improved data collection. It also linked implementation to the European Semester, the Social Scoreboard, UNCRPD reporting, and a mid-term assessment (European Commission, 2021). The 2026 enhancement continued the Platform, proposed reform of the EU UNCRPD monitoring framework by 2028, committed to stronger equality and disability data, and sought greater disaggregation by type of disability (European Commission, 2026). These arrangements strengthened procedural accountability.

Yet D/HH learners were not identified as a required constituency within the education-policy consultation arrangements examined. Moreover, no document in the corpus established EU-wide indicators specifically addressing sign-language access, interpreter or transcription availability, caption quality, communication choice, or accessible participation in synchronous learning. Accountability was more developed for digital compliance: the Web Accessibility Directive requires monitoring and enforcement, the audiovisual framework requires progress reporting, and the Accessibility Act relies on conformity and market-surveillance mechanisms (European Parliament & Council of the European Union, 2016, 2018a, 2019). Educational communication rights remained less directly measurable and enforceable.

5.7. Cross-Policy Coherence and Change between the Two Strategic Periods

Vertical coherence was strongest in principles and weakest in educational operationalization. The UNCRPD constructs a detailed normative chain from non-discrimination and accessibility to sign-language learning, Deaf linguistic identity, appropriate communication modes, qualified personnel, individual support, and reasonable accommodation. EU disability policy incorporated the Convention's rights-based language and increasingly referenced accessibility, mainstream inclusion, participation, and monitoring. Mainstream education policy, however, transferred mainly the universal elements of Article 24, quality, inclusion, accessibility, and individualized support, while rarely carrying forward its Deaf-specific linguistic and

communication provisions (European Commission, 2020b, 2021; Council of the European Union, 2021a, 2021b, 2022).

Horizontal coherence depended on combining policy domains. Disability policy recognized rights and institutional responsibility; education policy established inclusion objectives; digital education identified accessible tools and capacity needs; electronic-communications law established equivalent-access and user-rights principles; and accessibility law and standards supplied more specific requirements for websites, media, communications, captions, real-time text, total conversation and sign-language video. These components were compatible, but across the documents examined no explicit policy pathway connected electronic-communications rights and technical accessibility requirements with a comprehensive educational framework covering language of instruction, interpretation, captioning, transcription, accessible platforms, personnel, funding and monitoring. The most detailed Deaf-specific educational provisions remained in the UNCRPD framework and a non-binding Parliament resolution, whereas the most legally binding and operationally specific EU provisions concerned defined digital products, services, audiovisual media and public-sector websites. The architecture was therefore complementary but functionally fragmented by legal basis, policy field, and competence.

The transition to the 2021–2030 period strengthened rights framing, participatory governance and implementation infrastructure. In digital accessibility, however, the development was cumulative: important elements of the binding legal architecture were adopted between 2016 and 2019, while the later period consolidated their implementation and connected them more closely with digital education, assistive technology and disability strategy.

The 2010 strategy organized action around broad areas such as accessibility and education and training but provided limited Deaf-specific recognition and less elaborate monitoring (European Commission, 2010). The 2021 strategy more explicitly aligned itself with the UNCRPD, acknowledged failures of accessibility and reasonable accommodation in mainstream education and vocational training, connected inclusion with digital transition and funding, and introduced participatory and monitoring mechanisms (European Commission, 2021). The 2026 enhancement added a disability-inclusive lifelong-learning flagship, future action on higher-education accessibility and support services, assistive-technology and digital-accessibility initiatives, stronger data ambitions, and a timetable for monitoring reform (European Commission, 2026).

This development increased scope and implementation orientation, but not equivalent Deaf-specific precision. Neither the 2021 strategy nor its enhancement embedded sign-language-medium or bilingual education, educational interpreting, real-time transcription, or caption-quality standards into education actions. Post-2020 education frameworks likewise became more attentive to disability, accessible digital learning, assistive technology, and individualized support without expressly addressing Deaf linguistic-cultural conditions. The principal change was a stronger general

architecture; the unresolved gap was its translation into integrated and measurable linguistic and communication guarantees. Table 3 synthesizes the direction and limits of policy change between the 2010-2020 and 2021-2030 periods across the principal analytical dimensions.

Table 3: Direction of Policy Change between the Two Strategic Periods

Dimension	**Direction of change, 2010-2020 to 2021-2030**	**Main development**	**Persistent gap**
Recognition	Limited improvement	Stronger general rights and disability framing	D/HH learners remain weakly explicit
Linguistic access	Little substantive change	Continued recognition through the UNCRPD framework	Weak integration into mainstream education policy
Communication support	Moderate improvement	Greater emphasis on accommodation and learner support	No common standards for interpretation, captions or transcription
Digital accessibility	Cumulative operational development across both periods	Binding accessibility and electronic-communications legislation was adopted mainly during 2016-2019 and was subsequently supplemented by technical standards, implementation measures and stronger links with digital education and disability strategy.	Limited translation of communications and technical-accessibility requirements into live pedagogy, communication-service quality and educational-institution responsibility.
Institutional capacity	Moderate improvement	Increased attention to training, support and infrastructure	Deaf-specific workforce and service standards remain undefined
Participation	Clear procedural improvement	Stronger stakeholder structures and dialogue	No guaranteed education-specific representation
Monitoring	Clear general improvement	Dashboards, data commitments and stronger reporting	Few Deaf-specific indicators of educational access
Overall coherence	Improvement, but incomplete	Stronger rights, digital and governance architecture	Linguistic and communication provisions remain fragmented

Note: Comparative assessments indicate the combined extent of change in policy visibility, specificity, implementation mechanisms and accountability. They do not represent quantitative scores or equivalent legal effects across instruments.

6. Discussion

6.1. From Formal Inclusion to Meaningful Educational Access

The findings indicate that EU policy has moved beyond a purely placement-based understanding of inclusion, but has not yet established a complete policy pathway to

meaningful educational access for D/HH learners. Across the 2021-2030 frameworks, inclusion is increasingly associated with accessibility, individualized support, digital participation, institutional capacity and monitoring. This is significant because the right to inclusive education requires transformation of educational environments rather than the admission of learners into otherwise unchanged systems (Committee on the Rights of Persons with Disabilities, 2016). Nevertheless, physical or digital presence and the formal availability of support remain insufficient proxies for equality. Meaningful access requires timely comprehension, real-time interaction, participation in assessment and collaborative learning, autonomy in communication, and membership within the educational community. For D/HH learners, these outcomes depend on the quality and continuity of language and communication arrangements, not merely on whether an accommodation is nominally available. Evidence from higher education highlights both the importance of interpreter expertise and responsiveness to learners' preferences and the risks created by fragmented institutional provision. Recent findings show that inadequate coordination can transfer responsibility for organizing access services to students and make participation dependent on repeated individual negotiation (Napier & Barker, 2004; Tannenbaum-Baruchi *et al.*, 2025). EU policy therefore comes closest to establishing the conditions for meaningful access when general inclusion commitments are connected with anticipatory accessibility, individual accommodation, qualified support and institutional accountability. Where these connections remain implicit, inclusion risks remaining formal rather than educationally substantive.

6.2. Horizontal Inclusion and Disability-Specific Responsiveness

The limited explicit visibility of D/HH learners should not be interpreted as proof that all horizontal disability policy is inherently inadequate. Broad provisions on non-discrimination, universal design, accessibility and reasonable accommodation establish a common rights floor and can prevent disability policy from becoming a set of isolated categorical regimes (United Nations, 2006; Degener, 2016). Universal accessibility may also reduce the need for learners to request the same adjustments repeatedly. Yet horizontal inclusion becomes insufficient when it assumes that generic references to disability automatically identify the barriers experienced by particular groups. The findings show that linguistic access, interpretation, captioning, transcription and communication choice often disappear when D/HH learners are absorbed into undifferentiated formulations. A balanced policy architecture therefore requires both universal and targeted elements. Anticipatory design should make digital platforms, audiovisual materials and institutional processes accessible from the outset, while reasonable accommodation should respond to individual language histories, preferences and learning contexts (Committee on the Rights of Persons with Disabilities, 2014, 2016). Disability-specific responsiveness does not entail prescribing one educational model. Rather, it clarifies which conditions a universal framework must be capable of delivering. Explicit recognition thus functions as an operational safeguard: it makes overlooked

linguistic and communication dimensions visible without weakening the universality of inclusive education.

6.3. Policy Coherence or Policy Fragmentation?

The EU architecture is neither fully coherent nor simply a collection of unrelated texts. Its components are normatively compatible and, when read together, provide substantial protection: disability policy articulates rights and participation; education policy establishes inclusion objectives; digital policy promotes accessible learning environments; and accessibility law and standards specify requirements for ICT, media and communications. Distribution of functions across instruments may therefore represent legitimate institutional specialization. Coherence does not require identical language or a single instrument, but mutually reinforcing objectives, responsibilities and implementation mechanisms (Nilsson *et al.*, 2012; Cejudo & Michel, 2017).

Fragmentation arises where the connection among these components must be reconstructed by institutions or learners rather than made explicit in policy design. Examples include linguistic rights not translated into education measures, technical rules detached from pedagogy, and inclusion commitments lacking Deaf-specific indicators. Different legal bases and levels of authority intensify this problem: detailed provisions may appear in non-binding resolutions, while binding measures govern only particular technologies, services or contexts. The result is an architecture with high normative compatibility but limited operational integration. Policy coherence for meaningful access should therefore be judged by whether the combined framework creates a foreseeable route from recognition to provision, funding, implementation and monitoring. On this criterion, the EU framework is complementary but incomplete and remains dependent on cross-sectoral coordination at EU, national and institutional levels.

6.4. Linguistic Recognition, Communication Choice and Learner Heterogeneity

The findings reinforce the need to treat sign-language recognition and learner heterogeneity as complementary rather than competing principles. The linguistic and cultural status of sign languages cannot be secured if they are framed only as compensatory tools. The UNCRPD's protection of sign-language learning, Deaf linguistic identity and education through appropriate languages responds to the historically distinctive position of Deaf learners (United Nations, 2006). Research likewise argues for sign-language-responsive planning that accommodates diverse language trajectories (Knoors & Marschark, 2012; Murray *et al.*, 2018).

Recognition should not, however, produce a presumption that all D/HH learners use sign language, identify culturally as Deaf, or require identical arrangements. Provision may involve direct linguistic access through sign-language-medium or sign-bilingual education; mediated communication access through interpreting; written-language access through captioning or real-time transcription; visually accessible pedagogy; hearing or assistive technologies; or combinations of these arrangements. Self-

assessed communication skills and objectively measured communication performance may also diverge, supporting individualized assessment and periodic review rather than reliance on fixed categorization or self-report alone (Spencer *et al.*, 2018). A rights-based policy should therefore protect sign languages as languages and educational media while ensuring that other forms of access are reliable, appropriately matched to the learner and not treated as substitutes for direct linguistic access where that is required. The appropriate objective is not modality neutrality, which can conceal unequal language conditions, but linguistic recognition combined with informed choice among genuinely available options, quality standards and institutional capacity.

6.5. The Limits and Potential of European Union-Level Policy

The gaps identified in the corpus must be interpreted within the constitutional limits of EU action. Articles 6, 165 and 166 TFEU leave the organization and content of education primarily to the Member States and exclude harmonization in this field (European Union, 2012). It would therefore be unrealistic to expect an EU strategy to determine a uniform language-of-instruction model, national interpreter entitlement or institutional support structure. This does not make EU policy marginal. The Union can shape practice through rights obligations within its competences, accessibility and internal-market legislation, strategic coordination, recommendations, funding conditions, procurement requirements, technical standards, data frameworks and mutual learning.

The stronger implementation orientation of the 2021 strategy and its 2026 enhancement illustrates this potential, particularly through monitoring, stakeholder participation, accessible digital infrastructure and disability-inclusive lifelong learning (European Commission, 2021, 2026). The principal opportunity is not centralization, but policy linkage. EU initiatives can require accessibility to be considered at the design stage, develop common guidance on communication access, connect funding with accessible delivery, and monitor whether general inclusion objectives reach learners with different communication requirements. Within existing competences, the EU can make national discretion more transparent, evidence-informed and accountable without displacing it.

6.6. Contribution to Existing Research

This study extends existing research by shifting the unit of inquiry from individual accommodations, institutions or national systems to the relationship among EU disability, education, digital and accessibility policies. Previous scholarship has established the heterogeneity of D/HH learners, the human-rights significance of sign-language education, and the practical importance of qualified and continuous communication support (Napier & Barker, 2004; Knoors & Marschark, 2012; Murray *et al.*, 2018). The analysis explains why these conditions may remain weakly operationalized despite relevant commitments across policy fields. Its central contribution is to use policy coherence as a criterion of meaningful access: rights become operationally significant

when recognition, provision, institutional responsibility, resources and accountability can be connected across the policy architecture.

The comparison between 2010-2020 and 2021-2030 further shows that stronger rights language, digital accessibility and monitoring do not necessarily produce equivalent specificity concerning linguistic access and communication services. This precludes assessing progress solely through expanded inclusive terminology. The study is limited to EU-level and UNCRPD documents and does not evaluate national transposition, institutional implementation or learners' lived outcomes. It also analyses policy design during an evolving strategic period. These limitations define its contribution: the findings identify the architecture that national and institutional actors must interpret and provide a basis for subsequent implementation research across countries and educational sectors.

7. Policy Implications

7.1. Making Deaf and Hard-of-Hearing Learners Explicit within Inclusive Education Policy

Future EU disability and education initiatives should identify D/HH learners as a heterogeneous group whose access may involve sign languages, spoken and written languages, captioning, transcription, hearing technologies, or combined arrangements. Explicit recognition should not create a separate or uniform educational model. Its purpose is to prevent linguistic and communication requirements from disappearing within generic disability categories and to clarify the responsibilities attached to inclusive education, accessibility, and reasonable accommodation (United Nations, 2006; European Parliament, 2016; European Commission, 2021).

7.2. Establishing Minimum Communication-Access Expectations

The Commission, Member States, and representative organizations should develop common, non-binding expectations for educational communication access. These should address qualified interpretation, accurate and synchronized captions, real-time transcription, accessible audiovisual materials, continuity of support, timely provision, and respect for informed learner choice among genuinely available options. Common expectations should define minimum outcomes and quality safeguards rather than prescribe one modality for all learners. UNCRPD obligations, electronic-communications rights, audiovisual-access provisions and technical accessibility requirements offer foundations for such guidance (United Nations, 2006; European Parliament, 2016; European Parliament & Council of the European Union, 2018a, 2018b; European Committee for Standardization *et al.*, 2021).

7.3. Strengthening Professional and Institutional Capacity

EU funding, cooperation, and implementation instruments should support the capacity required to convert rights into routine provision. Priorities should include teacher education in linguistic and communication accessibility, sufficient numbers of qualified interpreters and transcription professionals, stable accessibility services, and interdisciplinary technical and pedagogical teams. Funding and procurement should cover staffing, maintenance, continuity, and quality assurance, not only equipment purchase. These priorities align with UNCRPD requirements for qualified personnel and EU commitments on accessible digital learning and disability-inclusive lifelong learning (Committee on the Rights of Persons with Disabilities, 2016; European Commission, 2020a, 2021, 2026).

7.4. Aligning Disability, Education and Digital Accessibility Policies

Accessibility should be integrated from the design stage of every relevant EU education initiative, funding call, platform, content repository, mobility scheme, and monitoring framework. Disability strategies should cross-reference education measures, while education policy should translate electronic-communications rights, accessibility law and technical standards into pedagogical and institutional requirements. A proportionate accessibility-impact check could accompany new EU-level initiatives, examining communication access, accessible multimedia, procurement, support responsibilities, and monitoring before implementation. This would strengthen horizontal coherence while respecting the Union's supporting competence in education (European Union, 2012; European Parliament & Council of the European Union, 2016; European Commission, 2020a).

7.5. Participation, Data and Accountability

Organizations representing D/HH people should participate from the earliest stages of policy design, implementation, and evaluation through consultations accessible by sign-language interpretation, captioning, transcription, and accessible documents. Monitoring should include ethically governed, appropriately disaggregated indicators on communication choice, support availability and timeliness, digital and audiovisual accessibility, and learner-reported participation. Results should be published through existing EU reporting mechanisms, with responsible bodies and review cycles identified. These arrangements would apply "nothing about us without us" while making progress towards meaningful access observable and accountable (Committee on the Rights of Persons with Disabilities, 2018b; European Commission, 2021, 2026).

8. Conclusion

8.1. Main Conclusions

The analysis shows that D/HH learners remain unevenly represented across EU policy. Within the corpus examined, their linguistic and communication rights are articulated most clearly in the UNCRPD framework and the Deaf-specific European Parliament resolution, whereas the principal mainstream education frameworks generally subsume them within broad categories of disability, special educational need or disadvantage. General commitments to inclusion are increasingly connected with accessibility, reasonable accommodation and digital participation, but they are not consistently translated into specific educational guarantees concerning sign language, interpretation, captioning, transcription and communication choice. The overall architecture is normatively compatible yet operationally fragmented across disability, education, digital and accessibility fields. Compared with the earlier strategic framework, the 2021-2030 period strengthens rights framing, participation, monitoring and implementation infrastructure. Digital accessibility reflects cumulative development across both periods, while equivalent Deaf-specific precision in linguistic access and communication support remains absent.

8.2. Original Contribution

The study demonstrates that meaningful educational access cannot be attributed to a single policy, accommodation or technology. It depends on the coherence of a wider system linking linguistic rights, communication services, accessible pedagogy and digital environments, qualified personnel, institutional responsibility, resources and accountability. By combining vertical, horizontal and temporal policy analysis, the article identifies the point at which broad inclusion commitments become operational, or remain incomplete, for a heterogeneous population of D/HH learners. It therefore reframes policy coherence as a substantive condition of inclusive education rather than an administrative ideal.

8.3. Directions for Future Research

Future research should compare how Member States transpose and implement this EU-level architecture across school, vocational, higher and adult education. Multi-country studies should combine policy and institutional analysis with the experiences of D/HH learners and their representative organizations. Further work should also evaluate the availability, quality and continuity of interpreting, captioning and transcription, as well as the accessibility of digital platforms, audiovisual materials and emerging communication technologies.

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