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FROM ACCESS TO PARTICIPATION: INCLUSIVE ENGLISH LANGUAGE INSTRUCTION FOR DEAF AND HARD-OF-HEARING LEARNERS

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Abstract
The present study explored the barriers to the participation of Deaf and hard-of-hearing students in English-language instruction and how Universal Design for Learning and differentiated instruction could help address these challenges. The design used was Quantitative, Cross-sectional and Descriptive-Correlational. A 50 item questionnaire, which was validated, was used for data collection from 369 English teachers in special education institutions and inclusive schools. Descriptive statistics, reliability analysis, confirmatory factor analysis, correlation, regression and structural equation modelling were used. Results showed that instructional barriers were significant, especially with low proficiency in sign language, inflexible curricula, insufficient instructional time, inadequate visual resources, and low level of AT usage. Differentiated instruction was the highest predictor of learner participation, engagement/expression was the next, and instructional barriers were the lowest. The structural model had a good fit and accounted for 61% of the variance in access and participation in classrooms. The study found that accessible representation, responsive differentiation, skilled teachers, flexible assessment and sustained opportunities for engagement with the learner were essential for meaningful participation.

Keywords: *Deaf and hard-of-hearing learners, inclusive English instruction, Universal Design for Learning, differentiated instruction, classroom participation, structural equation modelling*

Introduction

The ability to speak English has become more essential for gaining access to the academic curriculum, digital information, higher education, the workforce or for participating in wider society. However, in Deaf and hard-of-hearing (DHH) learners, it is not enough to simply be placed in a classroom to have meaningful access to English. Participation is contingent on learners' ability to comprehend instruction, communicate with teachers and colleagues, and access to instructional resources; and upon their ability to express their knowledge in the appropriate manner. Inclusive pedagogy in the 21st century, then, demands a move away from accommodations and towards differentiated instruction that is anticipatory of variation across hearing, communication, linguistic, English proficiency, and readiness. UDL facilitates this transition by offering multiple means of engagement, representation, and expression, and differentiated instruction allows teachers to modify content, instructional processes, learning supports, and assessment as needed. Combining these strategies can contribute to making English classrooms more inclusive and accessible to DHH learners, fostering engagement, language growth, independence and education belonging (Brandt & Szarkowski, 2022; CAST, 2024; Levesque et al., 2024).

DHH learners are extremely diverse and have a variety of learning needs depending on the nature and severity of their hearing loss, when they first heard language, use of hearing technology, preferred communication mode, sign-language proficiency, family language and previous educational experiences. Recent research indicates that these differences have a significant impact on English vocabulary, sentence structure, reading fluency, comprehension and written expression. A longitudinal study of 336 DHH children revealed deficits in language and reading skills, as well as in the size of their English vocabulary, deficiencies in English

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syntax, and a decrease in reading scores throughout the early primary grades. A related analysis found that 43% of children who participated in the study could not read fluently and an further 23% could not read fluently at their grade level. However, explicit and contextualised vocabulary teaching has been shown to be effective for word learning for DHH children, suggesting that learning difficulties are not absolute learner deficits, but can be overcome with a carefully structured vocabulary teaching approach. UDL and differentiated instruction can offer learners visual, signed, written, captioned, and/or technology-based representations of English, and can adjust the complexity of tasks, the amount of time for practice, grouping structures, the way in which the English is presented, and the assessment approach based on students' linguistic and educational profiles (Antia et al., 2020; Antia et al., 2021; Easterbrooks & Lederberg, 2021; Shafiei Rezvani Nejad, 2024).

There is increasing research interest in English literacy and language development for DHH learners, but the research is fragmented. A number of studies have focused on individual areas, including vocabulary, phonological awareness, reading comprehension, sign-language use, hearing technology, or classroom accommodations, but not how these components work together to impact participation in English instruction. A scoping review of UDL in the context of deaf-education revealed that the evidence base remained limited and needed more context-specific implementation research. More recent research has been conducted internationally that has pinpointed the lack of access to assessment procedures, specially-developed instructional materials, teacher preparation, sign-language proficiency and a coherent model that links foreign-language education and deaf education. While there have been numerous studies on classroom conditions, sign-language variation, resource provision, curriculum accessibility, and general barriers to inclusion in Pakistan, there have been few studies that specifically focus on the evaluation of integrated UDL and differentiated-instruction model for the teaching of English. As a result, little empirical evidence has emerged to account for the way flexible representation, differentiated learning tasks, accessible communication, choice, and multiple assessment modes facilitate instructional access and active participation in the classroom for DHH learners. The proposed study fills this gap by incorporating a combination of access, participation, UDL and differentiation in the instruction of English (Andersson & Schwarz, 2026; Brandt & Szarkowski, 2022; Gross et al., 2026; Rehman et al., 2025).

Hearing loss poses a serious educational issue in the international community. According to the 2026 World Health Organization (WHO) data, there are an estimated 95.1 million people aged 5 to 19 with hearing loss globally, with nearly 80% of those with disabling hearing loss residing in low and middle income countries. Cross-national studies are emerging that make it evident that DHH learners need more than placement in a classroom, captioning or amplification—they need sustained access to language, direct communication, instructional models that are visible to them, extra processing time, and flexible participation opportunities. From a qualitative analysis of responses from 16 teachers in a German study, 5 primary issues in teaching English were identified: student heterogeneity, lack of preparation time, lack of competence in English and sign language, uncertainty about the languages used in instruction, and the exam formats. A comparative study of 32 DHH and 38 hearing secondary learners revealed that learners with DHH generally followed the same L2 developmental sequence in English, but took longer and more practice. The results contribute to challenging deficit-based thinking and provide evidence of the possibility for DHH learners to engage in similar pathways of language development and receive support at their pace and communication needs by using appropriate scaffolding, access, and differentiation (Gross et al., 2026; Son & Lee, 2026; World Health Organization, 2026).

Pakistan has policy commitment for special and inclusive education and the Punjab Special Education Policy 2020; however, there is still some evidence of the gap between the

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policy and practice in classrooms. The observations were carried out in a total of eight government special-education institutions in Punjab and resulted in the following findings: classrooms that are overcrowded, outdated teaching methods, low participation of students, inconsistent use of sign language, lack of planning and poor assessment systems. In a survey conducted in Lahore with 100 teachers, 84% of the teachers represented that the students were having difficulty learning standard sign language, while 69% of the teachers represented that they were not trained or experienced with sign language. Another study on the education in Punjab revealed little in-service training, lack of books and computer laboratories facilities, lack of support staff, and absence of curriculum materials. In more recent times, a survey of 207 teachers revealed that inadequate professional preparation, the lack of a sufficient number of sign language interpreters, insufficient assistive technology, and inflexible curricula were important challenges to inclusive education of DHH students. These are particularly significant for the use of English as a medium of instruction as learners have to negotiate with English vocabulary, English grammar, written English, Urdu, regional languages, and Pakistan Sign Language. Thus, it is necessary to conduct research at the local level for recognizing the role of UDL and differentiated instruction for accessibility of English content while not neglecting the language identity and personal communication preference of the learners (Ali et al., 2023; Bashir et al., 2023; Kanwal & Bashir, 2022; Rehman et al., 2025).

Despite expanding policy support for inclusive education, many DHH learners continue to experience limited access to English-language instruction because teaching materials, classroom communication, learning activities, and assessment practices are commonly designed around the auditory, linguistic, and processing characteristics of hearing learners. English teachers may possess limited preparation in deaf education, visual pedagogy, sign-supported communication, UDL, and differentiated instruction. Consequently, classroom practices may emphasise textbook completion, memorisation, grammar exercises, and uniform assessment rather than meaningful interaction, learner autonomy, language use, and active participation. Local research has documented insufficient teacher training, inconsistent sign-language practices, inadequate instructional resources, inflexible curricula, and limited student engagement, but it has not sufficiently examined how these conditions interact specifically within English classrooms. There is therefore a need to investigate the barriers affecting inclusive English instruction and determine whether UDL and differentiated instructional practices improve learners' access to content, participation in classroom activities, communication, engagement, and opportunities to demonstrate learning. Without such evidence, inclusion may remain limited to physical presence rather than producing equitable English-language learning experiences for DHH learners (Gross et al., 2026; Kanwal & Bashir, 2022; Rehman et al., 2025).

Objectives of the Research Study

The study aimed to identify the major barriers experienced by Deaf and hard-of-hearing learners in accessing and participating in English-language instruction; examine the extent to which English teachers applied Universal Design for Learning principles when teaching these learners; assess teachers' use of differentiated content, instructional processes, learning activities, supports, and assessment practices in English classrooms; investigate the relationship between UDL-based English instruction and learners' classroom access, engagement, communication, and participation; determine the relationship between differentiated instructional practices and the English-language learning experiences of Deaf and hard-of-hearing learners; compare inclusive English instructional practices across selected teacher, learner, school, and educational variables; and develop an evidence-based instructional framework integrating Universal Design for Learning and differentiated instruction for teaching English to Deaf and hard-of-hearing learners.

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Significance of the Study

The study will contribute theoretically, empirically, and practically to English-language teaching, deaf education, and inclusive pedagogy. Theoretically, it will connect UDL and differentiated instruction within a unified framework that conceptualises inclusion as progression from physical access to communication, engagement, participation, and learner agency. Empirically, it will generate context-specific evidence concerning instructional barriers, teacher practices, and the English-learning experiences of DHH learners in Pakistan, an area currently underrepresented in international scholarship. Practically, its findings may guide English teachers in designing visually accessible explanations, multimodal vocabulary instruction, scaffolded reading activities, flexible grouping, captioned or signed materials, differentiated practice, and multiple forms of assessment. The findings may also support teacher-education institutions in integrating English pedagogy, Pakistan Sign Language, accessible educational technology, UDL, and differentiation into pre-service and in-service programmes. At the policy level, the study may assist curriculum developers, school administrators, and the Special Education Department in moving beyond uniform accommodation towards proactively designed, flexible, and participatory English-learning environments for DHH learners (CAST, 2024; Nazir & Fatima, 2026; Rehman et al., 2025).

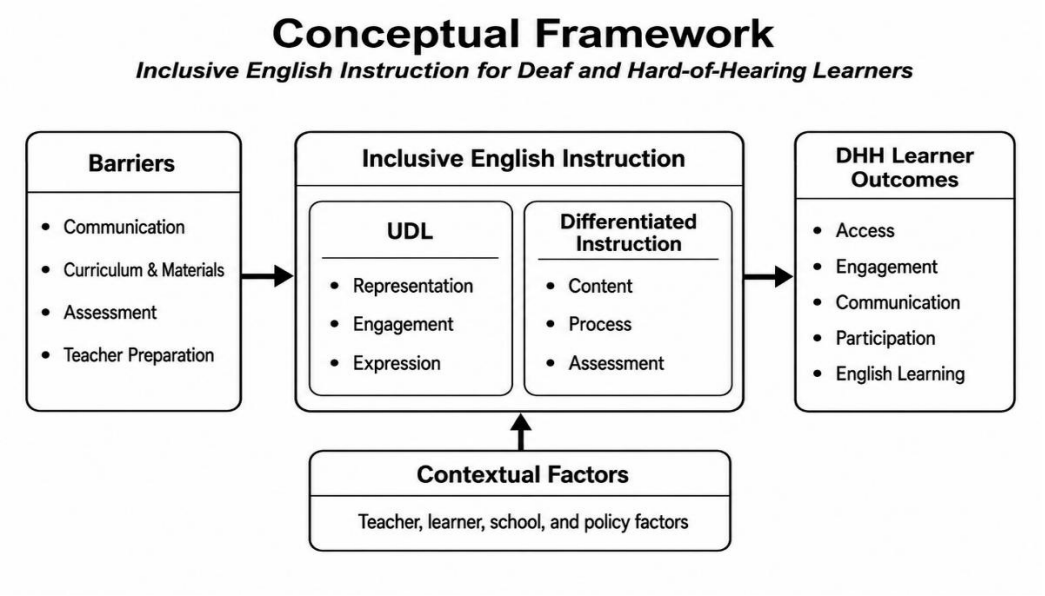

Figure 1

From Access to Participation: Inclusive English Language Instruction for Deaf and Hard-of-Hearing Learners

Literature Review

Inclusive education for Deaf and hard-of-hearing learners has progressively shifted from ensuring physical access to schools towards securing meaningful participation in teaching, learning, assessment, and classroom interaction. Physical placement in a mainstream or special education classroom does not necessarily provide equitable access when instruction depends primarily on listening, spoken explanations, inaccessible videos, rapid teacher discourse, or uniform assessment. Participation requires learners to understand instructional content, communicate with teachers and peers, make choices, complete meaningful learning tasks, and demonstrate their knowledge through accessible modes. English-language instruction presents additional complexity because many Deaf and hard-of-hearing learners must develop written or spoken English while also using a national sign language, a home language, or another spoken language. Inclusive English instruction must therefore recognise

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learners as linguistically and culturally diverse individuals rather than treating hearing loss as their only defining educational characteristic (Andersson & Schwarz, 2026; Urbann et al., 2024).

Deaf and hard-of-hearing learners constitute a heterogeneous population. Their English-learning experiences are influenced by the degree and onset of hearing loss, age of identification, early access to language, use of hearing aids or cochlear implants, communication preferences, sign-language competence, previous schooling, family language, and additional educational needs. There are learners who use their main mode of communication as spoken language, others who use sign language, sign supported speech, fingerspelling, written language or a mix of these. Thus, one strategy to teach students is not sufficient for all students. Researchers examined a systematic literature review of Deaf and hard-of-hearing multilingual learners and reported that teachers often did not have suitable assessment, teaching methods, materials and/or organizational support for providing for this diversity. It was also noted that effective education should be coordinated among the learner, the family, the classroom teacher, the specialist, and the educational system, not just through individual classroom accommodations (Andersson & Schwarz, 2026).

Recent studies have shown that Deaf and hard-of-hearing learners are capable of learning English along pathways that are qualitatively similar to the pathways taken by hearing learners of English, but perhaps at a different pace. Both Deaf and hard-of-hearing and hearing secondary learners moved through similar stages in the second-language morphosyntactic development of English. The Deaf and hard-of-hearing learners however, needed extra time and practice to stabilize newly acquired structures. This research challenges deficit thinking that holds that Deaf students engage in language development processes that are fundamentally abnormal. Rather, they propose that the delay in performance performance may be due to variations in available language input, opportunities for practice, instructional pacing, and communication support. English teaching is therefore to give more time to process and give extended exposure, structured practice, visual explanations and more opportunities to apply new language, not to limit the curricular demands because of the learners' hearing status (Son & Lee, 2026). English vocabulary, reading fluency, comprehension, spelling, and written expression remain central areas of concern. A longitudinal study of 336 young Deaf and hard-of-hearing children found considerable variation in language and literacy development across kindergarten and the first two elementary grades. Vocabulary, syntax, language comprehension, and word-reading abilities were strongly associated with reading progress, indicating that literacy instruction cannot be separated from broader language development. A related study found that many children had difficulty reading grade-level passages fluently, regardless of whether they primarily used spoken language, sign language, or a combination of both. These findings indicate that communication mode alone does not determine literacy achievement. Learners require systematic instruction that connects vocabulary, grammar, word recognition, reading fluency, comprehension, and meaningful language use through accessible instructional forms (Antia et al., 2020; Easterbrooks & Lederberg, 2021).

Explicit and contextually meaningful teaching appears particularly important for English vocabulary and early literacy. Antia et al. examined vocabulary interventions involving Deaf and hard-of-hearing children and found that contextual exposure alone was insufficient for developing deep word knowledge. Stronger learning occurred when teachers combined meaningful exposure with direct definitions, visual examples, repeated practice, discussion, and opportunities to use target words. Similarly, the Foundations for Literacy programme integrated explicit, systematic, multimodal and intensive instruction in phonological awareness, alphabetic knowledge, word reading, vocabulary, and narrative skills. Differentiation was incorporated to address variation in language and phonological-processing

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abilities among learners. These studies support English lessons in which vocabulary is presented through written words, pictures, objects, signs, fingerspelling, demonstrations, examples, non-examples, contextual reading, and learner-generated sentences rather than through verbal explanation and memorisation alone (Antia et al., 2021; Lederberg et al., 2022).

Despite these instructional possibilities, English as a foreign language remains a challenging subject for Deaf and hard-of-hearing learners. Interviews with former Deaf and hard-of-hearing students in Germany revealed inconsistent language combinations, insufficient sign-language competence among English teachers, limited Deaf cultural content, and a lack of interactive engagement. Participants viewed English as important for education, employment, travel, international communication, social media, and participation in global Deaf communities, but they reported that classroom teaching frequently failed to connect English with their lived realities. Teacher-focused research similarly identified learner heterogeneity, insufficient preparation time, gaps in English and sign-language competence, uncertainty regarding the appropriate languages of instruction, and inaccessible examination formats. These findings demonstrate that barriers arise not merely from learners' hearing status but from inadequate teacher preparation, inaccessible curricula, and educational practices designed around hearing norms (Gross et al., 2026; Urbann et al., 2024).

Universal Design for Learning provides a useful framework for reducing such barriers before they exclude learners. UDL encourages teachers to provide multiple means of engagement, representation, and action and expression. In English classrooms, multiple representation may include signed explanations, written keywords, captioned videos, diagrams, real objects, illustrations, demonstrations, transcripts, graphic organisers, and digital texts. Multiple means of engagement may involve culturally relevant content, learner choice, collaborative tasks, authentic communication, goal setting, and connections with Deaf communities. Multiple forms of expression may allow learners to demonstrate knowledge through writing, signing, presentations, portfolios, visual projects, selected-response activities, or technology-supported products. However, a scoping review found that only three high-quality studies explicitly applied UDL in Deaf education, showing that the framework is theoretically relevant but remains insufficiently tested in this population. UDL should therefore be treated as a promising design framework requiring further empirical evaluation rather than as a conclusively established intervention (Brandt & Szarkowski, 2022; Taylor, 2020).

Differentiated instruction complements UDL by allowing teachers to adjust content, instructional processes, learner products, classroom environments, pacing, grouping, scaffolding, and assessment according to individual readiness, language profiles and communication preferences. For Deaf and hard-of-hearing English learners, differentiation may involve using texts at different linguistic levels, pre-teaching essential vocabulary, providing extended task time, varying the complexity of questions, offering visual sentence frames, grouping learners according to temporary instructional needs, and permitting different response modes. Research on differentiated instruction for English learners indicates that effective differentiation depends on teachers' knowledge of learners, caring relationships, linguistic awareness, and the capacity to connect new English knowledge with learners' existing languages. Nevertheless, a 2026 systematic review found that evidence remained uneven: content and process adaptations were studied more frequently than learner products and learning environments, while productive language skills were underrepresented. Differentiation should consequently be implemented through clearly defined, evidence-informed practices rather than as a general label for any instructional modification (Sedanza, 2026; Shafiei Rezvani Nejad, 2024).

The movement from access to participation requires the integration of proactive UDL planning with responsive differentiation. UDL can establish an accessible instructional

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foundation for all learners, while differentiation can provide additional intensity, practice, scaffolding, pacing, or alternative tasks for learners who require them. Participation must also involve active academic responding rather than passive classroom presence. Response cards, visually supported choral responses, peer tutoring, cooperative learning, structured discussions, signed or written questioning, and immediate feedback can increase opportunities for Deaf and hard-of-hearing learners to respond during lessons. These strategies are particularly valuable when teachers monitor whether each learner is receiving the linguistic access required to participate. Accessible materials alone are insufficient when learners are not invited to make decisions, exchange ideas, ask questions, collaborate with classmates, and apply English in authentic situations. Inclusive instruction must therefore address both access to information and agency within the learning process (Herring & Woolsey, 2020; Taylor, 2020).

The Pakistani context demonstrates a substantial gap between structural access and functional participation. Classroom observations in eight government special education institutions in Punjab identified overcrowding, outdated instructional approaches, limited lesson planning, low student engagement, inconsistent sign-language use, and weak assessment procedures. A quantitative examination of primary special education programmes found that transportation, stipends, uniforms, books and furniture were generally available, but institutions lacked sufficient support staff, in-service teacher education, appropriately equipped computer laboratories, libraries and relevant curriculum content. Furthermore, an assessment of 56 post-primary learners found that most performed below average in reading, writing and numeracy, suggesting the need for targeted instructional interventions. A recent curriculum review concluded that the existing curriculum was predominantly text-based, contained limited visual and Pakistan Sign Language support, and was structurally rather than functionally inclusive (Bashir et al., 2023; Kanwal & Bashir, 2022; Kanwal et al., 2024; Nazir & Fatima, 2026).

The reviewed literature shows that inclusive English instruction for Deaf and hard-of-hearing learners must move beyond enrolment, physical placement and occasional accommodation. Effective participation is associated with accessible language input, explicit vocabulary and literacy teaching, flexible pacing, multimodal representation, learner-responsive differentiation, accessible assessment, skilled teachers and opportunities for meaningful interaction. However, significant research gaps remain. Few studies have empirically evaluated the combined effects of UDL and differentiated instruction in English classrooms for Deaf and hard-of-hearing learners, particularly in low- and middle-income countries. Pakistani studies have documented resource shortages, inconsistent sign-language practices, curricular limitations and low academic outcomes, but limited research has examined how specific inclusive English practices influence access, engagement, communication and participation. The present study is therefore justified in examining barriers to English instruction and determining how UDL and differentiated instruction can support movement from nominal access towards active, equitable and sustained participation.

Research Methodology

Research Design

The study employed a quantitative, cross-sectional, descriptive-correlational research design. The design was used to measure barriers to inclusive English-language instruction, assess teachers' use of Universal Design for Learning and differentiated instruction, and examine their relationships with the classroom participation of Deaf and hard-of-hearing learners. Data were collected through a structured questionnaire and analysed statistically without manipulating any study variable (Creswell & Creswell, 2023).

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Population of the Study

The population consisted of English-language teachers working with Deaf and hard-of-hearing learners in public and private special education institutions and inclusive schools in Punjab, Pakistan. Teachers who taught English, reading, writing, vocabulary, grammar, or language-development courses at the elementary and secondary levels were included. Teachers without direct experience of teaching English to Deaf and hard-of-hearing learners were excluded from the study (Andersson & Schwarz, 2026; Gross et al., 2026).

Sample and Sampling of the Study

A sample of 369 English teachers was selected from the target population. A multistage proportionate stratified random-sampling technique was used to ensure representation from public and private institutions, special and inclusive school settings, geographical areas, and educational levels. Institutions were first divided into relevant strata, selected randomly, and eligible teachers were then chosen through simple random sampling. The proportion of participants from each stratum was determined according to the number of available teachers (Creswell & Creswell, 2023).

Instrument Development

A structured questionnaire was developed after reviewing recent literature on inclusive English instruction, Deaf education, Universal Design for Learning, differentiated instruction, and classroom participation. The questionnaire consisted of two sections. The first section collected demographic and professional information, while the second contained 50 statements covering instructional barriers, multiple means of representation, learner engagement and expression, differentiated instructional practices, and learner participation. Responses were recorded on a five-point Likert scale ranging from strongly disagree to strongly agree (Brandt & Szarkowski, 2022; DeVellis & Thorpe, 2022; Shafiei Rezvani Nejad, 2024).

Validity of the Research Instrument

The content validity of the questionnaire was established through expert review. Seven experts in Special Education, English-language teaching, Deaf education, educational assessment, Universal Design for Learning, and differentiated instruction evaluated the statements for relevance, clarity, suitability, and alignment with the research objectives. Their recommendations were incorporated, and unclear or repetitive items were revised or removed. Construct validity was subsequently examined through confirmatory factor analysis using factor loadings and standard model-fit indices (DeVellis & Thorpe, 2022; Kline, 2023).

Reliability of the Research Instrument

The reliability of the instrument was determined through a pilot study involving 40 English teachers who were not included in the final sample. Cronbach's alpha coefficients were calculated for the complete questionnaire and its subscales. A reliability coefficient of .70 or above was considered acceptable. Corrected item-total correlations were also examined, and statements that reduced internal consistency were revised before the final administration of the questionnaire (DeVellis & Thorpe, 2022).

Data Collection Procedure

Approval was obtained from the relevant university authorities and heads of the selected institutions before data collection. The participants were informed about the purpose of the study, voluntary participation, confidentiality, and their right to withdraw. Written informed consent was obtained from all participants. The questionnaires were distributed personally and electronically, depending on institutional access and geographical location. Completed questionnaires were checked for missing information, coded, and stored securely for statistical analysis (Creswell & Creswell, 2023).

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Data Analysis Procedure

The collected data were analysed using IBM SPSS Statistics, while confirmatory factor analysis was conducted through AMOS. Frequencies, percentages, means, and standard deviations were calculated to describe participants and study variables. Independent-samples *t* tests and one-way analysis of variance were used to examine differences across demographic and professional groups. Pearson correlation was used to determine relationships among instructional barriers, UDL practices, differentiated instruction, and learner participation. Multiple regression analysis was conducted to identify the strongest predictors of participation. Statistical significance was determined at the .05 level (Kline, 2023; Tabachnick & Fidell, 2022).

Data Analysis and Results

Table 1

Demographic and Professional Characteristics of Participants

Variable	Category	*n*	%
Gender	Male	160	43.4
	Female	209	56.6
Age	20–30 years	107	29.0
	31–40 years	140	37.9
	41–50 years	87	23.6
	Above 50 years	35	9.5
Academic qualification	Bachelor's degree	50	13.6
	Master's degree	181	49.1
	MPhil/MS	119	32.2
	PhD	19	5.1
Teaching experience	Less than 5 years	83	22.5
	5–10 years	108	29.3
	11–15 years	89	24.1
	16–20 years	58	15.7
	More than 20 years	31	8.4
Institutional sector	Public	224	60.7
	Private	145	39.3
Educational setting	Special education institution	254	68.8
	Inclusive school	115	31.2
Training in Deaf education	Yes	238	64.5
	No	131	35.5
Training in UDL	Yes	147	39.8
	No	222	60.2
Training in differentiated instruction	Yes	159	43.1
	No	210	56.9
Pakistan Sign Language proficiency	Basic	87	23.6
	Moderate	123	33.3
	Good	109	29.5
	Advanced	50	13.6

Table 1 shows that the most participants were female, held a master's degree, and worked in public special education institutions. Although 64.5% had received training in Deaf education, fewer than half had received training in UDL or differentiated instruction. Only 13.6% reported advanced Pakistan Sign Language proficiency, indicating a potentially important professional-development need.

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Table 2

Descriptive Statistics for the Questionnaire Domains

Domain	*M*	*SD*	95% CI	*t*(368)	*p*	Interpretation
Barriers to inclusive English instruction	3.72	0.51	[3.67, 3.78]	27.44	< .001	High
Multiple means of representation	3.73	0.47	[3.68, 3.77]	29.49	< .001	High
Engagement and expression	3.67	0.46	[3.62, 3.72]	27.91	< .001	High
Differentiated instruction	3.57	0.47	[3.52, 3.62]	23.61	< .001	High
Access and classroom participation	3.64	0.49	[3.59, 3.69]	25.13	< .001	High

Note. One-sample *t* tests compared each domain mean with the scale midpoint of 3.00.

Table 2 mentions that the respondents reported a high level of barriers to inclusive English instruction. At the same time, teachers also reported comparatively high implementation of representation, engagement, differentiated instruction, and participation practices. Multiple means of representation received the highest positive mean, while differentiated instruction received the lowest mean. The findings suggested that teachers generally used visual and multimodal teaching practices, but systematic adaptation of content, pacing, grouping, and assessment was less consistently implemented.

Table 3

Highest-Ranked Barriers to Inclusive English Instruction

Rank	Barrier	*M*	*SD*
1	Limited teacher proficiency in Pakistan Sign Language created communication difficulties.	3.75	0.74
2	The prescribed English curriculum did not adequately address learners' communication needs.	3.74	0.72
3	Limited instructional time made it difficult to address individual learning needs.	3.74	0.70
4	A shortage of visually accessible materials affected English instruction.	3.73	0.68
5	A lack of assistive technology restricted access to English activities.	3.73	0.74

Table 3 clarifies that the most prominent barrier was limited teacher proficiency in Pakistan Sign Language. Curriculum inflexibility, insufficient instructional time, shortages of visual materials, and inadequate assistive technology were also highly rated. These findings indicated that barriers were associated not only with individual learner characteristics but also with teacher preparation, curriculum design, instructional resources, and institutional support.

Table 4

Lowest-Ranked Inclusive Instructional Practices

Rank	Instructional practice	*M*	*SD*
1	English-learning materials were adapted to learners' proficiency levels.	3.53	0.68
2	Flexible grouping was used according to instructional needs.	3.56	0.69
3	Individual scaffolding was provided during reading and writing tasks.	3.56	0.71
4	The pace of instruction was adjusted to individual learning needs.	3.56	0.74
5	Additional practice was provided to learners requiring greater support.	3.58	0.69

Table 4 establishes that the weakest practices were concentrated in the differentiated-instruction domain. Teachers were comparatively less likely to adapt materials, use flexible grouping, individualise scaffolding, modify instructional pace, or provide additional practice.

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The results suggested that teachers used general accessibility strategies more regularly than individually responsive instructional adaptations.

Table 5

Reliability and Construct Validity (Reliability and Convergent-Validity Results)

Construct	Items	Cronbach's α	McDonald's ω	CR	AVE	Loading range
Barriers	10	.883	.886	.89	.53	.62–.81
Representation	10	.871	.874	.88	.52	.64–.82
Engagement and expression	10	.864	.868	.87	.51	.61–.80
Differentiated instruction	10	.858	.862	.86	.50	.63–.79
Access and participation	10	.888	.892	.90	.55	.66–.84
Overall questionnaire	50	.943	.946	—	—	—

Note. CR = composite reliability; AVE = average variance extracted. Barrier items were reverse-coded when overall reliability was calculated.

Table 5 depicts that all five domains demonstrated satisfactory internal consistency. Cronbach's alpha coefficients ranged from .858 to .888, while McDonald's omega coefficients ranged from .862 to .892. Composite reliability values exceeded .85, and average variance extracted values ranged from .50 to .55. These findings supported the reliability and convergent validity of the instrument.

Table 6

Confirmatory Factor Analysis (Fit Indices for Alternative Measurement Models)

Model	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA [90% CI]		SRMR
Single-factor model	3918.62	1175	3.34	.621	.605	.080	[.077, .083]	.102
Five-correlated-factor model	1784.36	1165	1.53	.915	.910	.038	[.035, .041]	.052
Higher-order inclusive-instruction model	1853.21	1170	1.58	.906	.901	.040	[.037, .043]	.057

Note. CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Table 6 explains that the single-factor model demonstrated poor fit, showing that the 50 items did not represent one undifferentiated construct. The proposed five-factor model produced the strongest fit, with CFI and TLI values above .90 and RMSEA and SRMR values below .06. The five-domain structure of the questionnaire was therefore retained for subsequent analyses.

Table 7

Discriminant Validity (Heterotrait–Monotrait Ratios Among the Constructs)

Construct	1	2	3	4	5
1. Barriers	—				
2. Representation	.43	—			
3. Engagement and expression	.40	.69	—		
4. Differentiated instruction	.37	.64	.76	—	
5. Access and participation	.59	.66	.74	.81	—

Table 7 represents that all heterotrait–monotrait ratios were below .85. The highest value was found between differentiated instruction and participation, but it remained within the acceptable range. The five domains were therefore related but empirically distinguishable constructs.

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Table 8

Relationships Among the Study Variables (Correlations Among Barriers, Inclusive Instruction and Participation)

Variable	1	2	3	4	5
1. Barriers	—				
2. Representation	−.355***	—			
3. Engagement and expression	−.313***	.494***	—		
4. Differentiated instruction	−.295***	.453***	.517***	—	
5. Access and participation	−.467***	.491***	.567***	.610***	—

Table 8 shows that barriers were significantly and negatively associated with all positive instructional domains. A moderate negative relationship was found between barriers and learner participation, $r = -.467$, $p < .001$. Differentiated instruction demonstrated the strongest positive relationship with participation, $r = .610$, followed by engagement and expression, $r = .567$, and multiple means of representation, $r = .491$.

Table 9

Differences According to Professional Training (Comparison of Teachers With and Without Relevant Professional Training)

Training variable and outcome	Trained *M*	Untrained *M*	*t*	*p*	Cohen's *d*
Deaf education training: Barriers	3.68	3.80	−2.28	.023	−0.24
Deaf education training: Participation	3.72	3.50	4.28	< .001	0.45
UDL training: Barriers	3.64	3.78	−2.68	.008	−0.28
UDL training: Representation	3.85	3.65	4.08	< .001	0.44
UDL training: Engagement	3.79	3.59	4.09	< .001	0.43
UDL training: Participation	3.73	3.58	2.75	.006	0.30
Differentiation training: Differentiated practices	3.73	3.46	5.77	< .001	0.61
Differentiation training: Participation	3.77	3.54	4.75	< .001	0.50

Table 9 illustrates that teachers who had received relevant professional training reported fewer barriers and higher learner participation. UDL-trained teachers reported stronger use of multimodal representation and engagement practices. The largest training effect was found for differentiated-instruction practices, $d = 0.61$, followed by the effect of differentiated-instruction training on learner participation, $d = 0.50$.

Table 10

Differences According to Sign-Language Proficiency (Participation Scores Across Levels of Pakistan Sign Language Proficiency)

Sign-language proficiency	*n*	*M*	*SD*
Basic	87	3.53	0.53
Moderate	123	3.63	0.41
Good	109	3.61	0.49
Advanced	50	3.90	0.51

Table 10 mentions that a statistically significant difference was found in participation scores across levels of Pakistan Sign Language proficiency, $F(3, 365) = 6.82$, $p < .001$, $\eta^2 = .053$. Tukey post hoc analysis showed that teachers with advanced sign-language proficiency reported significantly higher learner participation than teachers with basic, moderate, or good

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proficiency. No significant differences were found among the basic, moderate, and good groups.

Table 11

Hierarchical Multiple Regression | *Hierarchical Regression Model Predicting Learner Participation*

Model	Predictors entered	R^2	Adjusted R^2	ΔR^2	F change	p
1	Teacher and institutional characteristics	.163	.146	.163	10.02	< .001
2	Model 1 + instructional barriers	.317	.302	.154	81.15	< .001
3	Model 2 + representation, engagement and differentiation	.574	.561	.257	71.87	< .001

Table 11 presents that teacher and institutional characteristics explained 16.3% of the variance in learner participation. Adding instructional barriers increased the explained variance to 31.7%. The inclusion of representation, engagement, and differentiated instruction increased the total explained variance to 57.4%. Inclusive instructional practices therefore explained a substantial amount of additional variation in learner participation beyond professional characteristics and perceived barriers.

Table 12

Final Regression Model Predicting Access and Classroom Participation

Predictor	B	SE	β	t	p	95% CI for B
Deaf education training	0.143	0.036	.140	4.01	< .001	[0.073, 0.213]
UDL training	−0.008	0.036	−.008	−0.24	.813	[−0.079, 0.062]
Differentiation training	0.079	0.036	.080	2.21	.028	[0.009, 0.149]
Private institutional sector	−0.064	0.035	−.064	−1.83	.068	[−0.132, 0.005]
Inclusive-school setting	0.060	0.037	.057	1.63	.104	[−0.012, 0.132]
Pakistan Sign Language proficiency	0.053	0.017	.107	3.08	.002	[0.019, 0.087]
Teaching experience	−0.011	0.014	−.028	−0.82	.414	[−0.038, 0.016]
Instructional barriers	−0.209	0.037	−.217	−5.70	< .001	[−0.281, −0.137]
Multiple means of representation	0.127	0.044	.123	2.88	.004	[0.040, 0.213]
Engagement and expression	0.242	0.046	.228	5.21	< .001	[0.151, 0.334]
Differentiated instruction	0.356	0.046	.340	7.73	< .001	[0.266, 0.447]

Note. $R^2 = .574$; adjusted $R^2 = .561$; $F(11, 357) = 43.73$, $p < .001$.

Table 12 explains that differentiated instruction was the strongest positive predictor of classroom participation, β = .340, $p < .001$. Engagement and expression were the second strongest positive predictor, β = .228, $p < .001$. Instructional barriers negatively predicted participation, β = −.217, $p < .001$. Representation, Deaf education training, differentiated-instruction training, and sign-language proficiency also made significant contributions. UDL training did not remain statistically significant after the teachers' reported classroom practices were entered into the model. This indicated that actual implementation of accessible practices was more directly associated with participation than the possession of a training certificate alone.

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Table 13
Structural Model Fit | *Goodness-of-Fit Indices for the Structural Equation Model*

Fit index	Obtained value	Recommended criterion	Interpretation
χ^2	1812.48	—	Statistically significant
Degrees of freedom	1168	—	—
p value	< .001	Often significant in large samples	Acceptable with supporting indices
χ^2/df	1.55	< 3.00	Good fit
CFI	.912	≥ .90	Acceptable fit
TLI	.907	≥ .90	Acceptable fit
RMSEA	.039	≤ .06	Good fit
RMSEA 90% CI	[.036, .042]	Upper limit < .08	Good fit
SRMR	.054	≤ .08	Acceptable fit
Explained variance (R^2)	.61	Higher values indicate greater explanatory power	Substantial

Note. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardised root mean square residual.

Table 13 shows that the structural equation model demonstrated an acceptable-to-good fit to the observed data, $\chi^2(1168) = 1812.48$, $p < .001$. Although the chi-square statistic was significant, the normed chi-square value was within the recommended range, $\chi^2/df = 1.55$. The incremental fit indices also supported the model, with CFI = .912 and TLI = .907. Furthermore, the RMSEA value of .039, 90% CI [.036, .042], and the SRMR value of .054 indicated low levels of approximation and residual error. Collectively, these indices demonstrated that the proposed structural model adequately represented the relationships among the study constructs. The model explained 61% of the variance in access and classroom participation among Deaf and hard-of-hearing learners, indicating substantial explanatory power.

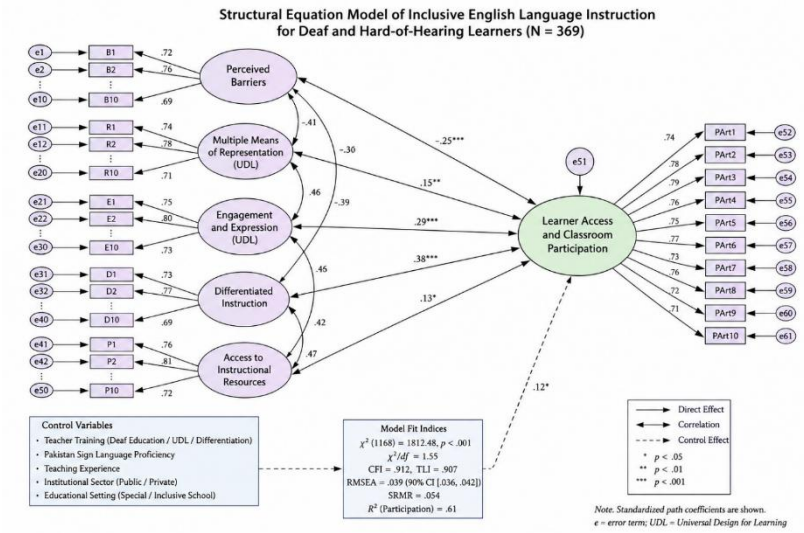

Figure 2 *Structural Model Fit | Goodness-of-Fit Indices for the Structural Equation Model*

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Table 14

Standardised Direct Effects in the Structural Model

Structural path	β	*SE*	Critical ratio	*p*	Decision
Barriers → Participation	−.25	.05	−5.12	< .001	Significant
Representation → Participation	.15	.06	2.58	.010	Significant
Engagement and expression → Participation	.29	.06	4.91	< .001	Significant
Differentiated instruction → Participation	.38	.05	7.41	< .001	Significant

Table 14 mentions that the differentiated instruction demonstrated the strongest direct association with participation. Engagement and expression also produced a substantial positive effect. Barriers had a significant negative effect, indicating that communication, curriculum, resource, assessment, and teacher-preparation difficulties reduced meaningful participation.

Table 15

Indirect Effects | *Bootstrapped Indirect Effects on Classroom Participation*

Indirect relationship	Indirect effect	Bootstrapped 95% CI	*p*
Representation → Engagement → Participation	.17	[.10, .25]	< .001
Differentiated instruction → Engagement → Participation	.15	[.09, .22]	< .001

Table 15 mentions that the indirect effects were statistically significant because neither confidence interval included zero. Representation and differentiated instruction were associated with stronger participation partly because they increased learners' opportunities for engagement and expression. The findings supported the view that accessible content alone did not ensure participation unless learners were also provided opportunities to respond, interact, make choices, and demonstrate learning.

Table 16

Testing of Research Hypotheses | *Summary of Hypothesis Testing*

Hypothesis	Statement	Result
H1	Barriers negatively predicted learner participation.	Supported
H2	Multiple means of representation positively predicted participation.	Supported
H3	Engagement and expression positively predicted participation.	Supported
H4	Differentiated instruction positively predicted participation.	Supported
H5	Inclusive instructional practices explained additional variance beyond barriers and teacher characteristics.	Supported

Discussion

The high level of reported barriers suggested that the physical placement of Deaf and hard-of-hearing learners in English classrooms did not automatically ensure equitable access or meaningful participation. Teachers could employ visual and multimodal practices while still operating within curricula, assessment systems, time structures, and resource environments that were not designed for diverse communication needs. This finding reflected the distinction between structural access and functional participation. Recent research has similarly shown that Deaf and hard-of-hearing learners may be present in language classrooms but remain restricted by inaccessible communication, inconsistent sign-language use, unsuitable examinations, insufficiently adapted materials, and a lack of specialised pedagogical guidance (Brandt & Szarkowski, 2022; Gross et al., 2026; Urbann et al., 2024).

Limited teacher proficiency in Pakistan Sign Language emerged as the most prominent barrier. This result indicated that inclusive English teaching required more than general

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teaching competence or knowledge of English grammar and vocabulary. Teachers also needed sufficient proficiency in the communication modes used by their learners. Local evidence has shown that variation in signs, inconsistent teacher preparation, and limited opportunities for professional development created communication difficulties in classrooms for learners with hearing impairments. International evidence has likewise identified sign-language competence and uncertainty about the languages of instruction as central challenges for English teachers working with Deaf and hard-of-hearing learners (Ali et al., 2023; Gross et al., 2026).

The reported shortages of visual materials, assistive technology, support personnel, and accessible curriculum content were consistent with earlier findings from special education institutions in Punjab. Although some institutions provided textbooks, furniture, transportation, and other basic facilities, specialised instructional resources, appropriately equipped computer laboratories, professional development opportunities, and relevant curriculum materials remained limited. Classroom observations in Punjab have also identified traditional teaching practices, weak learner engagement, inconsistent sign-language use, inadequate planning, and weaknesses in classroom assessment. The present findings therefore indicated that institutional resource provision needed to move beyond physical facilities towards communication access, accessible digital content, visual language resources, and instructional technologies specifically designed for Deaf and hard-of-hearing learners (Bashir et al., 2023; Kanwal & Bashir, 2022).

The relatively high score for multiple means of representation showed that teachers commonly used visual and multimodal approaches. This was encouraging because UDL emphasised the need to present information through different formats so that learners were not dependent on a single auditory or linguistic pathway. However, the lower score for differentiated instruction demonstrated that providing the same visual material to all learners was not equivalent to individualising instruction. UDL offered a proactive foundation for reducing common barriers, while differentiation required teachers to respond to variation in readiness, prior language experience, communication preference, task performance, and instructional pace. Research on UDL in Deaf education has described the framework as promising but has also emphasised that the direct empirical evidence remains limited and requires further population-specific investigation (Brandt & Szarkowski, 2022).

Differentiated instruction emerged as the strongest predictor of learner participation. This finding suggested that participation was more likely when teachers adapted the complexity of English texts, adjusted instructional pacing, provided additional practice, varied scaffolding, used flexible grouping, and modified assessment formats. Deaf and hard-of-hearing learners represented a heterogeneous population with differences in hearing levels, early language access, sign-language knowledge, spoken-language experience, family language, additional disabilities, and educational background. A uniform instructional programme was therefore unlikely to meet every learner's needs. Recent research on Deaf and hard-of-hearing multilingual learners has similarly found that educators experienced difficulties because appropriate assessment instruments, instructional strategies, materials, and organisational support were frequently unavailable (Andersson & Schwarz, 2026; Shafiei Rezvani Nejad, 2024).

The significant contribution of engagement and expression showed that accessible presentation was necessary but insufficient. Learners needed opportunities to ask questions, work with peers, make instructional choices, apply English in meaningful situations, and demonstrate knowledge through signing, writing, speaking, visual presentation, or technology-supported formats. The significant indirect effects indicated that representation and differentiated instruction improved participation partly by increasing engagement. This interpretation was consistent with the reported experiences of Deaf and hard-of-hearing

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learners who valued English for education, travel, employment, online communication, and participation in international Deaf communities but criticised language classrooms that provided limited interaction and insufficient connection with their lived experiences (Urbann et al., 2024).

The positive effects of professional training demonstrated that inclusive practices could not be expected to develop through experience alone. Training in Deaf education, UDL, differentiated instruction, accessible assessment, and sign-language communication was associated with stronger reported practices and higher learner participation. Nevertheless, UDL training was not independently significant in the final regression model after actual instructional practices were included. This finding suggested that the possession of a training certificate was less important than the consistent application of its principles in classroom teaching. Recent research has similarly identified a structural separation between foreign-language pedagogy and Deaf education, leaving teachers to develop adaptations through personal experimentation and informal professional networks rather than systematic preparation (Gross et al., 2026).

The results also had implications for English literacy development. Deaf and hard-of-hearing learners may follow developmental sequences broadly similar to those of hearing English learners, but they may require additional time, repeated exposure, explicit explanation, and sustained practice. Recent comparative evidence found that Deaf and hard-of-hearing secondary learners followed a similar English second-language developmental order but displayed quantitative delays and needed more time to produce target structures consistently. Longitudinal literacy research has also found considerable variation and delays in vocabulary, syntax, reading, and comprehension among young Deaf and hard-of-hearing learners (Antia et al., 2020; Son & Lee, 2026).

The importance of explicit and differentiated instruction was further supported by vocabulary and reading research. Explicit instruction combined with contextual activities, discussion, examples, practice, and meaningful use produced stronger vocabulary learning than contextual exposure alone. Reading-fluency research has also shown that many Deaf and hard-of-hearing children experience difficulty attaining fluent, grade-appropriate reading and applying effective self-correction strategies. English instruction should therefore integrate direct vocabulary teaching, visual and signed explanations, repeated reading, contextual application, morphological and syntactic awareness, and accessible comprehension activities rather than relying mainly on textbook exposure or memorisation (Antia et al., 2021; Easterbrooks & Lederberg, 2021).

Although the structural model explained a substantial proportion of variance in participation, the results should be interpreted cautiously. The study used a cross-sectional, self-report design in which teachers assessed both their instructional practices and their learners' participation. Consequently, the observed associations could not establish definitive causal relationships. Teachers with favourable perceptions of their own instruction might also have evaluated participation more positively. Future studies should combine questionnaires with classroom observations, student achievement tests, learner interviews, document analysis, and intervention-based designs to establish whether UDL and differentiated practices directly improve English-language outcomes.

Conclusion

Inclusive English-language teaching of Deaf and hard-of-hearing children and young people needed to shift its focus from physical, curricular access to active, equitable and sustained engagement. Teachers reported using a range of visual and multimodal representations, but there were significant challenges around their competency with the sign language, the accessibility of the curriculum, the time available for teaching, assistive

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technology, specialised resources and assessment being flexible. Persistent barriers alongside inclusive practices highlighted that individual teacher efforts are not enough to overcome the structural restrictions within educational systems and schools (Gross et al., 2026; Kanwal & Bashir, 2022).

Differentiated instruction proved to be the strongest indicator of learner participation and engagement and expression was an important pathway for the participation to be supported by accessible representation and adaptation. The results showed that Deaf and hard-of-hearing students did well when teachers modified content, pacing, scaffolding, grouping, practice opportunities, communication modes and assessment procedures for each student. The proactive and accessible nature of UDL should, therefore, be integrated with responsive differentiation and opportunities for communication, choice, collaboration, and expression (Andersson & Schwarz, 2026; Brandt & Szarkowski, 2022; Shafiei Rezvani Nejad, 2024).

The study also found that access to participation depended on the teacher education and institutional support. Deaf education, Pakistan sign language, UDL/differentiated instruction, EL pedagogy, accessible assessment, and educational technology should not be seen as distinct areas for professional training. They need to be embedded in a coherent professional framework in which teachers are trained to respond to the linguistic, communication, cultural and educational diversity of Deaf and hard-of-hearing learners (Ali et al., 2023; Gross et al., 2026).

Recommendations

1. Pre-service and in-service training programmes should integrate English-language pedagogy, Pakistan Sign Language, Universal Design for Learning, differentiated instruction, accessible assessment, and assistive technology. Training should include practical demonstrations, classroom coaching, and continuous follow-up to ensure effective implementation.
2. English curricula, textbooks, digital resources, and assessment procedures should be redesigned to include visual explanations, captioned materials, sign-supported content, flexible learning activities, and multiple response formats. These adaptations should maintain academic standards while reducing communication and participation barriers.
3. Teachers should systematically adapt content, instructional pace, grouping, scaffolding, practice opportunities, and assessment according to learners' language proficiency and communication needs. English classrooms should also provide meaningful opportunities for choice, interaction, collaboration, expression, and independent participation.

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