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Teachers without Tools: Professional Development Needs of Educators Serving Deaf Students in Resource-Constrained Settings

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ABSTRACT

One of the most demanding and under-resourced roles in the world of special education is taught by a teacher of the deaf and hard of hearing (DHH) in a low-resource environment. Teachers who teach Deaf children and youth in Pakistan, in the province of Punjab, regularly face compound deprivation in terms of classrooms with few or no hearing assistive technologies, pre-service teacher preparation programmes that lack deaf pedagogy, and little to no structured in-service teacher development, and institutional environments with little supervisory support or collegial professional exchange. This is a qualitative study using grounded theory approach in an interpretative paradigm to explore the professional development needs for educators working with deaf students in resource-limited contexts in Punjab. In-depth semi-structured interviews, focused group discussions with hearing-impaired teachers and non-participant classroom observations in 6 government special education institutions for the hearing impaired were used to generate data. The study identifies six key areas of need for the professional development of SLPs: sign language competence, proficiency in communication mediums, pedagogy for deaf students, deaf-specific literacy instruction, hearing assistive technology and management of the acoustic environment, bilingual-bicultural educational approaches, and identity-affirming and culturally responsive deaf education practice, guided by Vygotsky's theory of the Zone of Proximal Development (ZPD), which suggests that professional development is most effectively achieved through structured and scaffolded interactions with more knowledgeable other(s). Systematically, the barriers to structural access are examined as compound contextual barriers, including financial scarcity, geographic isolation, provider scarcity, communication mode ideological contestation, and workforce instability. The article ends with a detailed list of policy and programmatic suggestions based on international evidence and the peculiarities of the special education system in Pakistan, particularly that of Punjab.

Keywords: Deaf Education, Professional Development, Resource-Constrained Settings, Sign Language, Vygotsky's Zone Of Proximal Development, Grounded Theory, Hearing Impairment, Punjab, Pakistan, Teacher Training, Bilingual-Bicultural Education, Deaf Pedagogy

1. Introduction

The educational disadvantage literature generally defines resource-constrained teaching contexts as having high numbers of students in classes, low-quality physical facilities, low-quality teaching materials, and low levels of specialist professional support. But resource constraint takes on a new, and qualitatively different, meaning for educators of deaf and hard-of-hearing (DHH) students: the lack of communicative, technological, and pedagogical resources that make effective deaf education possible. A teacher who cannot speak the language of instruction (LOS) of her deaf students, such as Pakistan Sign Language (PSL), Urdu Sign Language (USL), or the family-specific gestural systems that many deaf children use to communicate at school, cannot teach. If a classroom is not acoustically equipped with HAT (hearing assistive technology), then it cannot ensure acoustic access for a student with a cochlear implant or hearing aids to support acquisition of spoken language (Marschark & Hauser, 2012).

All these aspects of resource constraint come together in Pakistan, particularly in Punjab. The province has a cluster of government special education institutions for the hearing impaired, including Special Education Centres (SECs) for the hearing impaired and Govt Training Colleges for the Teachers of Disabled Children in which educators of the hearing impaired work under compound professional deprivation. Many teachers are appointed in hearing-impaired classrooms with diploma-level qualifications that gave limited exposure to the use of Pakistan sign language, deaf cultural perspectives, visual teaching methods or the audiological concepts needed to understand and accommodate the diverse hearing profiles of the students in their classrooms (Akhtar & Yasmin, 2011). On entering the workplace, they are faced with an in-service system of work that offers episodic, generic disability training, and not much else, that does not take into account the specific competency needs of deaf education.

Most of all, the effects of these conditions are experienced by the children who are deaf. Quality of teacher preparation and professional competence has been found consistently in international research to be the strongest within-school factor influencing academic achievement and language development for the DHH population, whose education is especially vulnerable to the communicative, pedagogical, and technological competence of their teachers (Luckner et al., 2005). Where teachers do not have sign language proficiency, deaf students are deprived of an instructional language that is understandable. The lack of teachers who are visually literate and trained in the development of deaf reading skills negatively affects students' acquisition of written language, which limits educational opportunities for them throughout their lives.

Although this is a crucial topic, there is limited qualitative, systematic research on the professional development needs of educators working with deaf learners in resource-limited contexts in Pakistan. This study aims to fill this void by conducting a qualitative grounded theory inquiry on the professional development needs, lived professional experiences, and structural barriers faced by teachers of deaf learners in the government special education

sector in Punjab. The following sections in the article are as follows: Section 2 is the theoretical background. In Section 3, the literature is reviewed with respect to the topic. The methodology of the research is described in detail in Section 4. The results are outlined in Section 5. Findings are analyzed in Section 6, using Vygotskian analysis. Section 7 limitations. Section 8 presents recommendations. Section 9 concludes.

A. Theoretical Framework – Vygotsky's Zone of Proximal Development

The study is guided by Vygotsky's (1978) Zone of Proximal Development (ZPD), as expressed by Lev Semenovich Vygotsky and summarized in Vygotsky (1986). The ZPD is the distance between what a learner can do independently and what the same learner can do with the help, with the collaboration and with the scaffolding of a more knowledgeable partner. It is in this zone that the most productive learning takes place, for a child in their cognitive development, or for an adult professional in the acquisition of a new skill: the zone of proximal development is the domain of the more competent other, which acts as a structured facilitator of learning that stands between the current level of independent performance and the future level of assisted performance (Vygotsky, 1978).

When used in the context of the professional learning of educators working with deaf learners, the ZPD framework yields analytically rich and practically significant observations. Teachers grow best when they engage in explicit interactions with others whose expertise and practice is greater than what they can do on their own. Passive, isolated, self-directed professional learning, which is the most common mode of in-service teaching in the resource-poor special education context in Punjab, is least effective because it is not in the ZPD and teachers are expected to acquire the competency without the framework, mediation and guidance provided by experts (John-Steiner & Mahn, 1996).

This principle has a unique and urgent implication for the teachers of deaf students in Punjab: the medium of instruction has to be common and skilled Deaf practitioners have to be the main mediators for effective professional development in deaf education. If professional development for hearing teachers of deaf students is provided only in spoken Urdu with no support of sign language access provisions and/or Deaf expert practitioners with their knowledge of deaf pedagogy, sign language, and the deaf community perspective is excluded from facilitating the professional development then the ZPD is violated most fundamentally (Swanwick, 2016). The principle of scaffolding, as suggested by Vygotsky, that structured support is given to a learner to help them perform at the upper limit of the ZPD is gradually faded as they become more autonomous, is the basis for the architecture of the professional development program that is recommended in this article (Rogoff, 1990).

3. Literature Review

Confirming the work of the international literature on teacher preparation and professional development of teachers of deaf and hard-of-hearing students, there is a clear competency framework that goes beyond the generic special education teacher preparation. Marschark

and Hauser (2012) determined that effective deaf education teaching has four competency clusters: visual teaching strategies, sign language proficiency, literacy instruction adapted for DHH learners, and understanding of hearing technology. Luckner et al. (2005) have conducted a thorough review of evidence-based literacy practices for DHH students, and have shown that the best in-class predictor of the reading achievement of DHH students is teacher knowledge about and competence in implementing these practices. Johnson (2006) noted that the Deaf community's knowledge is critical to teacher preparation for deaf education; and that teacher preparation programs which systematically involve Deaf teachers and Deaf cultural informants produce teachers who have enhanced sign language proficiency and more culturally affirming orientations to teaching.

Rahman and Abbasi in their study (2016) in Pakistan's unique setting, presented the most extensive documentation of Pakistan Sign Language ever produced, confirming that it is a natural language with unique phonological, morphological and syntactic properties, which has direct implications for teacher preparation, as raising a skilled PSL communicator and teacher is not about learning only Urdu or manual coding, but is about learning a natural language with distinct linguistic features. Akhtar and Yasmin (2011) reported that in Pakistan the preparation programs of special educators were generalist and PSL was not being taught adequately in the existing diploma and degree programs. Imran et al. (2011) found that educational and health professionals in Pakistan lack basic knowledge about the consequences of hearing loss on development and communication, thus the need for systematic development of audiological literacy among special education teaching workforce. The research literature on bilingual-bicultural (Bi-Bi) models of deaf education has built up an impressive body of evidence supporting the ability of children with a strong sign language proficiency as their first language to achieve better outcomes in literacy in spoken-language reading and writing when compared with deaf children educated through oral-only or sign-suppressed strategies (Cummins, 2006). Humphries et al. (2012) conducted a rigorous examination of the evidence for natural sign language as the best first language medium for the cognitive and linguistic development of the deaf child, and concluded that the Bi-Bi orientation is the most empirically defensible educational philosophy for deaf children. Swanwick (2016) developed a complete framework for pedagogy in DHH education that includes the linguistic, cultural, and communicative aspects of how DHH students are taught in various educational settings—one that serves as the conceptual structure of the domains of the professional development needs identified in this study.

As cochlear implant surgeries and provision of hearing aids have grown in developing country settings, hearing assistive technology (HAT) management has been identified as an important teacher competency by Easterbrooks and Estes (2007) and Flexer (2011). If teachers don't have the necessary skills to listen to students' devices every day, know how to recognize when something is wrong, know how to manage acoustics in the classroom and communicate with audiological services, they don't maintain technological access to sound for their students, and the impact of this is felt on language development as well as the communicative

challenges of the hearing loss itself. Teachers' professional development literature has focused on the need to receive hands-on training, device-specific training, and clinically supervised training which is not provided by the pre-service and in-service teacher training in Pakistan (Flexer, 2011).

4. Research Methodology

4.1 Research Paradigm

This study adopts an interpretivist research paradigm which is based on the belief that social reality can be created through the subjective meanings, interpretations and experiences of people who are situated within a cultural and institutional context (Creswell, 2013). The goal of this study understanding how educators serving deaf students in resource-constrained environments in Punjab interpret and experience their professional development needs, their institutional contexts, and the obstacles they may face to achieving the professional competencies needed to effectively teach deaf students—is best addressed by the interpretivist paradigm. Constructivist is the ontological position: The professional realities of deaf education teachers in Punjab are constructed by the interaction of individual professional histories, institutional cultures, policy environments and cultural frameworks – which are non-exhaustively subjectively measurable in relation to others but must be explored from the insider, subjective perspective of those who experience them (Lincoln & Guba, 1985).

4.2 Grounded Theory Design

The qualitative design used was grounded theory qualitative design as described by Charmaz (2014) in the constructivist grounded theory. Grounded theory is a systematic qualitative approach to analysis that involves the iterative process of data collection, constant comparative analysis, theoretical sampling, and theoretical saturation that allows for the induction of theory from the data, in that data is collected in relation to the theory that is being developed and that theory is constantly refined as the data emerges. The grounded theory design was found to be suitable for this study because the needs of professional development and institutional barriers of educators working with deaf students in this resource-constrained context in Punjab have not been theorised in the Pakistani research literature, therefore an inductive approach of developing a theory from data was considered to be epistemologically more appropriate than a deductive approach of testing the hypothesis (Strauss & Corbin, 1998).

The constructivist version of grounded theory (as developed by Charmaz, 2014) was chosen over the objectivist version by Glaser and Strauss (1967), because it recognizes co-construction of theoretical understanding between researcher and participant, acknowledgment of the positionality of the researcher in the analytical process, and the situatedness of generated theory within the specific cultural and institutional contexts of data collection; epistemological commitments that are consistent with the interpretivist paradigm and with the cultural particularity of the context of deaf education in Punjab. The most important analytical method used throughout the study was the systematic comparison of

incidents, codes, and categories across the data to find similarities, differences, and theoretical relationships, known as constant comparative analysis (Charmaz, 2014).

The study's context and setting are presented.

Six government special education institutions for the hearing impaired in Punjab were selected and the study was carried out in these institutions, using purposive sampling, which gave diversity in terms of institutional type (SECs for hearing impaired, Govt Training College for Teachers of Disabled Children), geographic location (Lahore, Multan, Faisalabad, and two district level institutions) and age of the students studied (from early childhood to secondary level). The multi-site design was selected to reflect the variation in institutional context, geographic accessibility conditions and professional community characteristics that affect the professional development environment for teachers of deaf students across the province of Punjab's varying geographical areas. Govt Training College for the Teachers of Disabled Children, Lahore with its institutional mandate to include in-service professional development for educators who are hearing impaired was included as a key informant and documentary analysis site.

4.4 Participants and Sampling

Purposive sampling was used for initial selection of participants to ensure those whose experiences were most relevant to the research questions. Twenty-eight participants from three categories were initially recruited: nineteen hearing impaired (JSET/HI and SSET/HI) qualified classroom teachers from the six case institutions, five classroom administration (principal and vice-principal) who had specific knowledge of the professional development provision and the issues they faced in developing their hearing impaired (HI) teaching staff and four professional development facilitators from the Govt Training College and PISE experienced in designing and delivering training for hearing impaired teachers. Teacher participants were selected according to the following criteria: engaged in teaching within a government special education institution for hearing impaired students; at least one year of classroom experience in the teaching of DHH learners; and agree to participate in an audio recorded interview and classroom observation.

Throughout the analytic process, theoretical sampling, a grounded theory procedure involving selection of additional participants and data sources as theoretical categories emerged to develop and test the evolving theoretical framework, was used (Charmaz, 2014). Three Deaf adults, who had experience working with the hearing-impaired education system in Punjab as parents, community advocates and informal educators were purposefully selected as key informants to offer their insider expertise on the Deaf community's relationship with the government hearing-impaired education system as these categories emerged from initial analysis. Data collection and theoretical sampling continued until theoretical saturation was achieved (Strauss & Corbin, 1998), which is when the addition of further interviews and observations did not produce any new categories or categories that varied significantly from the others.

4.5 Data Collection Methods

Three complementary qualitative data collection methods were used, following the triangulation guidelines of rigorous qualitative inquiry. Individual in-depth semi-structured interviewing was the main technique used. In total, there were 35 individual interviews, 28 with the full sample of participants and seven with additional participants identified through the theoretical sampling process as the sample was developed. All interviews were conducted in Urdu and interviews with Deaf key informant participants were conducted in PSL with the help of a certified PSL interpreter. The interviews lasted between half an hour and an hour and a half and were tape-recorded with the permission of the interviewees, and video-recorded in PSL for the purposes of properly transcribing the signed language. A set of interview guide questions was created for each participant category that asked about pre-service experiences with PSL preparation, in-service professional development participation and perceived impact, gaps in specific competencies for deaf pedagogy, HAT management, and Bi-Bi approaches, institutional communication mode philosophy and implications for professional development, and barriers to access and maintain professional learning (Kvale & Brinkmann, 2009).

Focused group discussion (FGD) was the second method used. Three focused group discussions were held, consisting of 5–7 hearing impaired teacher participants from three geographical groups: Lahore metropolitan, secondary city (Multan and Faisalabad), and district. The FGDs were in Urdu, took around 90 minutes each and were audio recorded with additional field notes of the researcher. The FGD format was selected because it has the potential to create data through social interaction and collective meaning-making processes which allowed for the exploration of shared professional experiences, collegial professional norms, and collective meaning-making processes through which teachers make sense of their needs for professional development and institutional constraints (Morgan, 1997).

The third approach used was non-participant classroom observation. Professional knowledge was observed in the classroom in each of the six case institutions for a total of 18 observations, each of which was at least 60 minutes in duration. An observation protocol was created with the following objectives: to observe teacher communication mode; to observe PSL proficiency in classroom use; to observe the use of visual teaching strategies and deaf pedagogy principles; to observe the use of hearing assistive technology in the classroom; to observe evidence of individualized instruction and IEP-referenced instruction; and to observe the quality and nature of teacher-student communicative interaction. Observation data served as a means of triangulating with interview data, thereby providing data for comparison between teachers' self-reported professional competencies and their demonstrated competencies in the classroom, which proved to be of significant analytical and policy-relevant discrepancies (Stake, 1995).

Students will learn the 4.6 Data Analysis: Grounded Theory Procedures.

Grounded theory methodology of Charmaz (2014) was used in data analysis, which encompassed initial coding, focused coding, axial coding, and theoretical integration. All interview tapes were fully transcribed in verbatim. The Urdu transcripts were translated into

English by a bilingual research assistant who has experience in deaf education, and then back translated for a twenty-five percent sample randomly selected. All PSL medium video-recorded interviews were transcribed into English by the PSL certified video recorder who was assigned as a PSL interpreter for these interviews. The classroom observation field notes and FGD transcripts were added to the extensive analytical database which also included individual interview transcripts.

Initial coding was the process of using descriptive codes line by line and using gerund-form codes (i.e., action-oriented labels) to capture the dynamic and processual nature of participants experiences — a common coding procedure in constructivist grounded theory (Charmaz, 2014). About 180 codes were created during initial coding of the data. Focused coding was used to identify the most common, meaningful and analytically useful initial codes and to elevate them to higher order categorical concepts, known as focused codes. These focused codes were then analyzed with axial coding which involved describing the properties and dimensions of each code, examining the relationship among codes, and determining the conditions, consequences and contextual factors of each categorical phenomenon (Strauss & Corbin, 1998). Theoretical integration of the categories into a coherent theoretical framework was undertaken in the last analytical phase, and Vygotsky's ZPD was used as a theoretical framework to interpret and place the emerging categorical structure into the already available theoretical framework. Throughout, analytical memos were created that documented the development of the grounded theory, the conceptual relationships that emerged, and theoretical ideas and analytical decisions, serving as audit trails and as a record of the development of the grounded theory (Charmaz, 2014).

4.6 Trustworthiness and Rigor

The four guidelines of rigorous qualitative research (Lincoln & Guba 1985) in the context of grounded theory methodology were used to establish trustworthiness. A series of institutional activities over a 5-month period of data collection, methodological triangulation across the three data collection methods, member checking of focused code summaries and emerging theoretical categories with a representative subset of participants, and peer debriefing at bi-weekly research team meetings, contributed to maintaining credibility. The emic perspectives brought by Deaf community key informants who participated with the hearing dominated culture of special education institutions in Punjab significantly improved the credibility of the findings regarding proficiency standards for PSL, Bi-Bi educational philosophy and Deaf community views about teacher preparation. The transferability was facilitated by thick description of study context, institutional settings, and participant characteristics. Extensive audit trail maintenance throughout the data collection and analysis was provided for dependability. Systematic researcher reflexivity was used to address confirmability, with each researcher keeping a reflective journal to note positionality, changing analytical views and decisions made at significant methodological points (Creswell, 2013).

4.7 Ethical Considerations

The following Institutional ethical approvals were sought before data collection: from the University of Education, research ethics committee and the Directorate of Special Education, Government of Punjab. Informed consent was obtained from all participants in their mode of communication, either written Urdu for hearing participants or PSL written Urdu summary for Deaf key informant participants. The consent process included clear communication about: voluntary participation and the right to withdraw; recording with audio and video and the reasons for this; procedures for confidentiality and anonymization; PSL interpreter as a confidential team member with the same confidentiality protections as the researchers; and the intended uses and outputs of the research. Special attention was paid to teacher participants' susceptibility to institutional authority pressures, and explicitly assured that participation and responses would not affect employment, and that institutional administrators would not have access to individual teacher data. All data were placed in locked files with a password and backed up in a locked research room that is only accessible by the research team (Lincoln & Guba, 1985).

5. Findings

5.1 Sign Language Competence: Most Basic Deficiency

In all the 6 case institutions, the most consistent and most pressing need for professional development was the development of Pakistan Sign Language communicative and instructional fluency. Teacher participants from all levels of their careers and from a variety of institutional settings reported that their PSL competence (mostly gained by hearing teachers) was not sufficient to meet the needs of their academic responsibilities in the hearing impaired classroom. 'I know the signs of familiar things and some action words,' was the watchword of one of the experienced teachers who had served for eleven years even in the classroom of Faisalabad. However, if I want to explain electricity, or a fraction, I have no idea! I indicate by pointing, imitate by mimicking and draw on the board. The children understand something but not what I intended.' This was a typical finding in the accounts of all institutional sites: that they knew the vocabulary level sign not "at the level of academic instruction in PSL," but rather at the level of "vocabulary level sign" without the discursive and spatial fluency required for academic instruction in PSL.

The Proficiency Gap in PSL was directly confirmed through classroom observations. During the 18 lessons observed, the teacher's oral communication with students included Urdu in 15 lessons, a mix of gesture approximations, fingerspelling, and Urdu in five, and isolated signs in two lessons, all of which were not consistent with PSL grammar, and were clearly not understandable to students with profound hearing loss. The problems of student confusion, off-task behavior, and the regular use of peer-to-peer communication that were noted in these lessons were consistent with the inaccessibility of the instructional language that PSL proficiency research has identified as the major factor in academic disengagement for deaf learners. The Deaf key informant participants provided the most analytically rich descriptions of the implications of teacher PSL deficiencies, one of the Deaf adults from the government SEC saying, 'Teachers thought they were teaching us. But what they were saying was not in

our language, not in their language, and not in their language enough for us to be able to understand it completely. We learned from each other, not from them.'

5.2 Deaf-specific Pedagogy and Literacy Instruction

Teacher participants identified one of the main professional development needs as the provision of visual teaching strategies that are specifically designed for DHH learners, with most describing their teaching and learning strategies as adaptations of those used in mainstream teaching, rather than using DHH specific pedagogical literature. Participants in the focused groups discussions in each of the three groups agreed that reading/writing is the area that most challenges their professional expertise and is the least well prepared. Teachers reported that they encountered the difficulties that deaf students had with reading without having any theory to explain the cross-linguistic transfer processes, phonological awareness problems, or vocabulary development patterns that underpinned the process of literacy learning for sign-language-first students — as well as without the pedagogical strategies that the evidence-based deaf literacy literature suggested would be most likely to support these processes (Luckner et al., 2005). One district-level teacher commented: 'We were taught that reading is about sounds. However, my students are not able to hear sounds. No one ever told me how to teach reading to a kid who has no sounds in his language.'

5.3 Hearing Assistive Technology: Critical Competency Not in Student's Preparation.

No teacher participants reported being formally trained on HAT in teacher preparation, and only two of the nineteen teacher participants reported in-service training events that addressed HAT management. Most teachers reported a lack of confidence in their ability to verify whether the cochlear implant processor (CIP) or hearing aids (HA) are working, in recognizing the behavioral indicators of a hearing aid or processor malfunction, and in communicating effectively with audiological services regarding the educational consequences of students' hearing profiles. Observations in the classroom showed several cases where the hearing aid device was visibly malfunctioning, with indicator lights on the hearing aid showing either low battery or processing errors, which were not noticed or responded to by the teacher. This observation is a direct and preventable violation of students' technological access to sound that is perpetuated systemically across all classrooms for hearing-impaired students in Punjab without the need for HAT professional development (Flexer, 2011).

5.4 Bilingual-Bicultural Philosophy: Ideological Contestation as Professional Development Barrier

The analysis showed a unique and analytically important structural obstacle in the professional growth of the pupils in the hearing-impaired education institutions in Punjab: the ideological struggle between the oralist and sign-language affirming educational philosophies. Administrator participants in three out of the six case institutions voiced explicit orientations towards the oral approach by describing sign language as a 'crutch' which hindered the performance of deaf students in spoken Urdu, and the potential of PD for PSL to be counterproductive to the goals of the institutions. This ideological stance within administration resulted in a professional development atmosphere where teacher-

participants were not allowed to speak about their perceived need for PSL and Bi-Bi professional development without implicitly questioning the philosophy of the institution. One teacher from a secondary city school explained how he had seen this tension hinder his students: 'I know in my own experience that my students have their understanding improved when they sign. But the principal insists that we all need to concentrate on speech,' he said. So in my classroom, I try to do both, but I am not trained in either properly.' Oralist versus Bi-Bi ideological divide in the hearing-impaired education institutions of the province of Punjab is not just a philosophical disagreement; it is an integral part of a more fundamental dilemma which needs to be addressed at the policy level: coherent professional development planning (Mahshie, 1995).

5.5 Structural barriers to professional learning

The grounded theory analysis resulted in five broad structural categories that created barriers to access and the impact of professional development across institutional contexts. Financial constraints (such as lack of budgets for professional development within institutions, need to travel to Lahore to attend central trainings, and lack of professional learning materials in Urdu) were found to be the most common barrier. Teachers at the district-level institutions said that the geographic isolation resulted in disproportionate access barriers, and some said they did not attend any professional development events in the past two years because of travel and expense. While a scarcity of qualified providers of professional development in the field of Deaf education was identified as a systemic barrier to the quality of any professional development made available, even if there is adequate funding, the lack of PSL-fluent and Deaf inclusive professional development providers was also highlighted. Administrators identified workforce instability (i.e., high turnover among trained teachers and frequent transfers of service) as the biggest institutional-level obstacle hampering the long-term sustainability of investment in professional development. In addition to the four barriers identified previously, a fifth barrier specific to the context of deaf education professional learning was identified and will be discussed: communication mode ideological contestation (Ladd, 2003).

6. Discussion

The grounded theory results, explained using the ZPD construct of Vygotsky, bring into sharp focus the reasons for the failure in professional development for teachers of deaf students in Punjab to produce the competencies in communication, pedagogy, and technology required for effective deaf education. The isolation of teachers in institutional settings with a lack of PSL-fluent colleagues, specialist coaching, and Deaf community engagement ensures that the expert-mediated learning needed to drive teacher professional development is systematically missing from the majority of hearing-impaired teachers' professional lives in Punjab. Whereas the learner is able to develop PSL fluency through their own study of vocabulary, the teacher can't develop Bi-Bi pedagogical competence or HAT management skills through an occasional

awareness workshop, but only through hands-on, clinically supervised practice with actual devices (John-Steiner & Mahn, 1996).

The ZPD framework also sheds light on the mechanism by which Deaf professionals are excluded from professional development facilitation and the perpetuation of the professional inadequacy cycle. Deaf signers have the expertise that hearing teachers of deaf students most need to acquire, and a hearing instructor can never replace that expertise. Their systematic exclusion from the professional development system takes away the most effective resource for supporting the most powerful ZPD available to hearing teachers in Punjab: the deaf cultural knowledge and pedagogical repertoire of Deaf teachers (Padden & Humphries, 1988). The rethinking of professional development for deaf education teachers in Punjab must involve not only new curriculum materials, but a rethinking of the role of the expert, one that is more inclusive of the knowledge and professional expertise of the Deaf community and puts it at the centre of the professional development process, not the edges.

The results of the grounded theory analysis identified that an ideological conflict between the oralist and Bi-Bi educational philosophies was a unique structural barrier, which is not solely addressed by professional development intervention. The clarification of the evidence base for communication mode philosophy in deaf education, as outlined in the convergent international evidence that a natural sign language foundation provides better linguistic, cognitive, and literacy outcomes for deaf learners, is a necessary precondition to the development of the institutional conditions that enable Bi-Bi professional development to be offered, valued, and implemented without administrative resistance (Humphries et al., 2012). The following are the limitations of this study:

There are some key limitations of this grounded theory, qualitative study that need to be noted. The selection of the six case institutions was made from a larger network of government hearing-impaired special education institutions in Punjab that were as diverse as possible in terms of institutional type, geographic location, and maturity; however, the results should not be representative of professional development experiences in the most geographically distant and atypical institutional contexts. This study developed a theoretical framework that must be interpreted as a contextually situated theoretical contribution to be used in similar contexts of the hearing-impaired education sector in Punjab, not as a comprehensive account of all professional development experiences in the sector. Secondly, the number of Deaf key informant participants ($n = 3$) is small, reflecting difficulties in accessing Deaf people with relevant experience and expertise in institutions that traditionally excluded Deaf people. Specific attention should be paid to the design of participatory methodologies that incorporate the voices and priorities of the Deaf community from the outset of inquiry design in the future. Third, given the need for teachers to know the time of the classroom observations, there is a risk of performance effects, which may result in an observation of a lesson that was more carefully prepared than is usual during the day. Those effects were mitigated by the extended period of institutional engagement and the

established rapport with teacher participants; however, they can not be guaranteed to be eliminated.

8. Recommendations

The Government of Punjab should order immediate review and reform of pre-service curricula for teacher credentials for hearing-impaired persons, incorporating longer, deeper, and high-credit courses in Pakistan Sign Language with the teaching of Pakistan Sign Language by the Deaf PSL-fluent teachers as a mandatory and essential part of all teacher preparation courses for hearing-impaired persons. A competency assessment of PSL should be conducted through validated communicative and instructional PSL assessments by qualified Deaf evaluators in order for the credential to be completed. In addition, pre-service curricula must build in required courses on visual pedagogy and deaf literacy instruction, bilingual-bicultural philosophy about teaching, hearing assistive technology educational management, and educational concepts about deafness (Spencer & Marschark, 2010).

A formal Pakistan Deaf Education Professional Development Framework needs to be developed under the leadership of PISE in collaboration with the Department of Special Education, University of Education, with the formal representation of Deaf community organisations. Deaf Education Instructional Coaching Initiative needs to create Deaf professional coaches who will deliver individual professional support in classrooms. The Online Pakistan Deaf Education Professional Learning Community should extend access to professional development for geographically isolated teachers by providing PSL instructional programming in video format, exemplars of classroom work by teachers in Bi-Bi, and virtual coaching systems (Easterbrooks & Estes, 2007). Institutional partnerships with formal Deaf community organisations in Pakistan should be developed to incorporate Deaf community knowledge into teacher professional development, curriculum development and institutional management. The proposed service structure reform requiring proficiency in PSL as a requirement for appointment and promotion in classrooms with hearing-impaired students will provide structural incentives to invest in continued professional development in sign language.

9. Conclusion

This study is a qualitative grounded theory study that has produced a theoretically grounded account with an empirically rich and contextually situated professional development needs of teachers working with deaf students in the resource-limited special education settings of Punjab. The study has used a constructivist grounded theory methodology, relying on semi-structured interviews, focused group discussions, and classroom observations in six Government institutions, and has yielded findings that reveal the depth, and systemic nature, of the professional preparation deficits, from PSL fluency to deaf pedagogy, HAT management, Bi-Bi philosophy, and early intervention collaboration, that characterize the professional landscape of hearing-impaired educators from Punjab.

The results, interpreted in light of Vygotsky's Zone of Proximal Development model, indicate that professional development reform needs to be reconceptualised as a social and mediated

process, rather than the transfer of knowledge to individual teachers, and should necessitate the formation of learning communities within the Deaf community with the expertise of partner professionals, in which teachers can develop the professional skills they require through ongoing, scaffolded interaction with the individuals who can answer the questions they have about teaching and learning. The teachers in the hearing-impaired classrooms of Punjab are without the communicative, technological, and pedagogical tools that their job requires and deserve a professional development system that is as large and as specific as their professional needs. These children who are deaf cannot be denied their right to depend on them.

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