The Effectiveness of Elkonin's Phonemic Awareness Training in a Child with Hearing Impairment: A Case Study

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ABSTRACT:

The present theoretical-empirical study examines Elkonin's Phonemic Awareness Training, with a specific focus on children with hearing impairment. The theoretical section outlines the concept of phonemic awareness, which is widely regarded as a significant predictor of successful reading and writing acquisition. It is essential to note that Slovak belongs to the group of alphabetic languages characterized by a relatively shallow orthography, a factor that should be taken into account when designing intervention programs.

Hearing impairment necessitates the use of educational approaches and methods that enable children to acquire knowledge through modalities accessible to their individual abilities and needs. The study aimed to implement an intervention targeting the development of phonemic awareness in a child with hearing impairment using Elkonin's Phonemic Awareness Training (Mikulajová, 2023), while also drawing upon the work of Nováková (2020), whose research has long focused on children with hearing loss. The participant´s progress was monitored through pre-test and post-test assessments, and the effectiveness of the intervention was evaluated by comparing the outcomes of both measurements.

Keywords: Phonemic Awareness. Hearing impairment. Intensive remediation. Elkonin's Phonemic Awareness Training.

1. Introduction

Phonemic awareness is currently considered one of the most important predictors of the development of emergent literacy skills. Its systematic and intensive stimulation represents a significant factor in preventing school failure, particularly in the acquisition of reading and writing skills. Special attention should be devoted to children with hearing impairment, who constitute a specific population due to the impaired functioning of the auditory analyser. As a consequence of hearing loss, these children often experience difficulties in the development of auditory perception, auditory discrimination, and subsequently phonemic awareness. This study addresses the issue of phonemic awareness not only in typically developing preschool children but also in children with hearing impairment. The theoretical framework is based on findings from both domestic and international research highlighting the importance of phonemic awareness in preparing children for literacy acquisition. Drawing on the acquired theoretical knowledge, phonemic awareness

stimulation was implemented through Elkonin's Phonemic Awareness Training (Mikulajová, 2023). This intervention program is methodologically well-developed, has been validated in various countries, and has demonstrated a positive impact on the development of phonemic awareness in children before school entry. Before the intervention was initiated, a thorough review of the participant's available documentation was conducted, including the preparation of a personal case history and an unstructured interview with the child's mother. The collected information provided a comprehensive understanding of the participant's developmental characteristics and enabled the intervention program to be tailored to his individual needs and abilities. The effectiveness of the six-month intervention was evaluated through pre-test and post-test assessment using selected subtests from the MABEL test battery (Caravolas et al., 2019).

The ability to perceive individual sound elements—phonemes (units with a distinctive function)—depends on the child's ability to understand spoken language. As language develops, attention gradually shifts from the sound structure of speech to its semantic content. As Lechta (2000, cited in Hrehová, 2013, p. 8) notes, "the child no longer perceives speech with phonetic precision but filters it through a phonological network, selecting only those phonetic elements that carry a distinctive function." Snow et al. (1998) define the ability to segment words into smaller units—from syllables to phonemes—as phonological and phonemic awareness. Phonological awareness refers to the ability to consciously differentiate and manipulate larger phonological units such as syllables and rhymes, whereas phonemic awareness concerns only the smallest units of speech, namely phonemes (Sodoro, 2002, cited in Grofčíková, Máčajová, & Zajacová, 2017, p. 21). Around the age of six, the development of phonological abilities in children with hearing impairment tends to lag behind that of their typically developing peers. Therefore, "the stimulation of phonological development in children with hearing impairment prior to school entry, including activities focused on awareness of the sound and articulatory structure of phonemes that constitute words, is essential for morphosyntactic development and speech comprehension and forms the basis of reading and writing in languages such as Czech and Slovak, which are based on the phonemic principle" (Mikulajová, 2020, p. 78). Ambrose, Fey & Eisenberg (2012) conducted a study involving preschool children with cochlear implants. Their findings indicated that these children possess considerable potential for the development of emergent literacy skills; however, targeted intervention in the area of phonological awareness is essential. Gilliver et al. (2016) emphasize that such intervention is effective only when accompanied by continuous vocabulary development, enabling children to establish associations between the phonological form of a word and its lexical meaning. One of the key factors influencing reading performance in deaf individuals is their level of spoken language comprehension, which is directly related to their ability to utilize phonology during reading and writing. According to Nováková (2020), deaf readers who do not rely on phonological processing may instead depend on visual memory for whole-word forms, contextual cues, or fingerspelling strategies. In deaf children, she assumes the existence of two visually supported phonological systems—one based on sign language and another based on fingerspelling. If fingerspelling is considered analogous to written letters, it may serve as an alternative pathway to spoken phonology. Elkonin's Phonemic Awareness Training is an intervention method based on the exploration of the sound structure of language. Through systematic exposure to phonemes, children develop a strong foundation for the natural formation of grapheme–phoneme associations, which are essential for successful literacy acquisition. The training is built upon three fundamental principles. The first principle, reading as a phonological task, emphasizes that reading comprehension is achieved through the interaction of phonemic awareness, letter knowledge, and spoken language comprehension. The second principle, visual

modelling, enables children to understand the phonemic structure of words, visualize the outcomes of their cognitive activities, and consciously manipulate linguistic units. The third principle involves working within the zone of proximal development, whereby children are presented with tasks that slightly exceed their current level of competence. In this process, the adult serves as a guide and facilitator, gradually reducing support until the child can complete the task independently. Within the program, children embark on an imaginative journey through the Land of Words and Sounds, inhabited by a variety of fictional characters, including Master Syllable, Master Length Mark, the Little Phonemes, the Mistake Germ, Sir Ypsilon, Fairy Ivana, and others. These characters represent important linguistic phenomena and help children understand abstract language concepts in an engaging and accessible manner. The methodology comprises 33 lessons in the pre-graphemic stage and 39 lessons in the graphemic stage. Each lesson is structured around a specific topic, objective, set of teaching materials, and key concepts to be introduced and practised.

2. Methodology

One of the principal research methods employed in the study was a comprehensive review of relevant domestic and international scholarly literature. The implementation of Elkonin's Phonemic Awareness Training requires the completion of accredited professional training, after which participants receive certification authorizing them to apply the method in educational practice. The selection of the research participant was considerably constrained by several specific inclusion criteria. The study could include only a child with hearing impairment attending the final year of preschool education. Additional requirements included the regular presence of a parent during intervention sessions and informed consent for the processing of personal data in accordance with the General Data Protection Regulation (GDPR). The primary intervention method was Elkonin's Phonemic Awareness Training. Its implementation was based not only on the official methodology of the program but also on the monograph When a Child Sees What They Are Supposed to Hear (Nováková et al., 2020), which focuses extensively on the education and development of children with hearing impairment. A single-case design was selected because children meeting the specified inclusion criteria are relatively rare, and the study aimed to explore intervention effectiveness in depth within a natural educational context. The research participant was a five-year-old boy, referred to as M., who was prelingually deaf with a hearing loss of 100% according to Fowler's classification. In 2022, he underwent bilateral cochlear implantation and currently perceives sounds within the speech frequency range.The child regularly attends speech-language therapy and educational audiology sessions aimed at supporting the development of his communicative competence. His speech is characterized by dyslalia and occasional grammatical inaccuracies. During the intervention process, notable delays were observed in colour perception and naming, early mathematical skills, and graphomotor development. The intervention was conducted twice weekly in the child's home environment with the active participation of a parent. The training followed the methodology described by Mikulajová et al. (2023) while also drawing on recommendations presented by Nováková et al. (2020). Nováková emphasizes that intervention planning for children with hearing impairment must take into account not only the child's age, degree of hearing loss, communication level, and language abilities, but also their capacity for imitation, sustained attention, and ability to follow instructions. Consequently, intervention should be provided individually over an extended period of time. Although active involvement of both family and school may be organizationally demanding, it has a direct impact on intervention outcomes. The conceptual foundations of the methodology remain unchanged for children with hearing impairment. However, because these children often experience difficulties perceiving the phonetic structure of words, the program incorporates special visual aids known

as "mouth stamps" (pusinky), which depict articulatory mouth positions used in the production of vowels and consonants. These visual representations enable children to conceptualize speech sounds that may otherwise be difficult to perceive auditorily. Some groups of phonemes share identical visual representations; therefore, their distinctions are explained through additional physical characteristics such as voicing, vibration, or airflow. During activities, the instructor begins pronouncing a word and pauses on the target phoneme. The child is then asked to identify the stamp corresponding to the articulatory configuration observed on the instructor's lips. A speech therapy mirror may also be used to support articulation practice and pronunciation accuracy. Based on years of practical experience, Nováková introduced a set of twelve articulatory stamps specifically designed for children with hearing impairment. For the purposes of this intervention, customized versions of these visual aids were created in the form of adhesive stickers, allowing for more flexible and engaging use during activities. Nováková (2020) further recommends the use of a reading strip, a simple paper strip onto which children place stamps representing individual phonemes while observing mouth positions during articulation. This strategy helps ensure that no phoneme is omitted, even when the child cannot perceive it auditorily because it falls outside their hearing range. In this context, it is important to note that every sound is characterized by two fundamental parameters: intensity (loudness), measured in decibels, and frequency (pitch), measured in hertz. These parameters are highly relevant in hearing assessment because they help determine which specific sounds a child may be unable to perceive. The principal benefits of the mouth stamps include:

- Providing visual representations of phonemes that the child may not be able to hear;
- Supporting the development of articulation skills through comparison of the child's own mouth movements with those of the instructor;
- Facilitating the development of speechreading (lip-reading) abilities.

During the pre-test assessment, it became evident that the participant demonstrated substantial difficulties in colour identification and naming. Consequently, systematic support in this area was incorporated into the intervention through the use of coloured stickers representing syllable patterns. Graphomotor development represented another area requiring targeted support. Writing syllable patterns proved challenging because the participant's graphomotor skills were insufficiently developed. Instead of producing the curved markings typically used to represent syllables, he tended to draw shapes resembling hills, which subsequently complicated the verification of syllable structures. To address this difficulty, pre-drawn syllable-pattern stickers were initially introduced. Once the participant had mastered the identification of correct syllable patterns, coloured stickers were incorporated, simultaneously supporting colour recognition and naming. Following the gradual automatization of both skills, syllable patterns were drawn in sand, enabling easy correction of errors while further promoting graphomotor development. Remediation of mathematical concepts and basic numerical operations was integrated into activities involving syllable clapping. After identifying the number of syllables in a word, the participant was required to select the corresponding syllable-pattern sticker from a larger set of alternatives. Selection was determined not only by syllable structure but also by a specific colour designated by the instructor. The child worked with stickers representing one-, two-, three-, and four-syllable patterns. All stickers were deliberately designed to be identical in size, eliminating the possibility of identifying the correct response based on visual cues unrelated to the target skill. In later stages of the intervention, counting syllables was added to clapping activities, thereby supporting the development of numerical concepts and strengthening connections between phonological and mathematical skills.

3. Results

- **Pre-Test and Post-Test Assessment**

The Multilanguage Assessment Battery of Early Literacy (MABEL) is considered a valid and innovative assessment instrument designed to evaluate early literacy skills and their predictors in children. It was developed by an international team of researchers as one of the outcomes of the European Initial Training Network (ITN) project. The battery was designed for children ranging from preschool age to the second grade of primary school and was developed within the framework of the ELDEL project between 2008 and 2012. Five longitudinal studies were conducted in England, France, Spain, Slovakia, and the Czech Republic, resulting in language-specific versions of the battery. Additional adaptations are currently being developed for French, Portuguese, and Polish. Given the characteristics of the participant and the objectives of the study, the following subtests were selected:

- Rapid Automatized Naming – Colours
- Rapid Automatized Naming – Objects
- Phoneme Isolation Test
- Phoneme Blending Test

It should be emphasized that the purpose of the assessment was not to compare the participant's performance with normative data for typically developing peers. Rather, the objective was to evaluate his individual progress before and after the intervention.

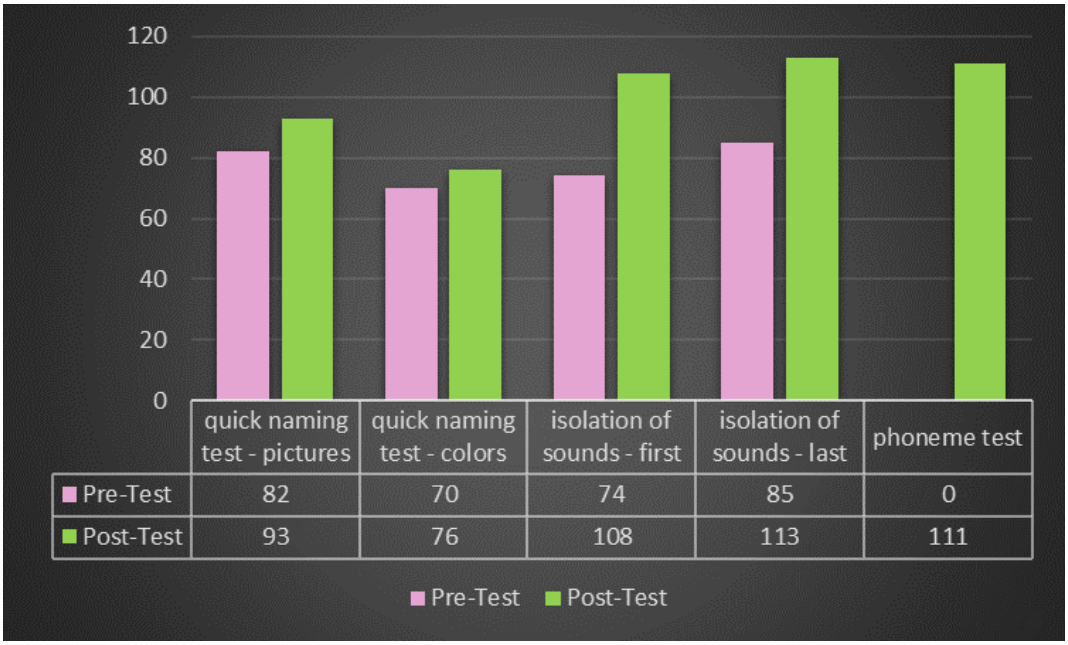

Figure 1 Pre-Test and Post-Test of diagnosis (Comparison results)

Source: Authors' own elaboration.

- **Pre-Test (October 2025)**

In the Rapid Automatized Naming – Objects subtest, Participant M. achieved a performance level corresponding to the low-average range. The result indicated slower lexical retrieval and a lower degree of automatization in naming visual stimuli. During the administration of the Rapid Automatized Naming – Colours subtest, the participant demonstrated significantly reduced cooperation. He frequently named colours incorrectly, invented responses, or answered with "I don't know." Although the resulting score fell within the below-average range, its interpretation should be approached with caution, as the child had not yet mastered the naming of basic colours. Furthermore, the prolonged response times were influenced by difficulties in maintaining engagement with the task. In the Phoneme Isolation Test, participant M. was able to correctly repeat most of the presented pseudowords. However, substantial difficulties emerged when he was required to identify the

initial or final phoneme within a word. According to age-related norms, his performance corresponded to the below-average range. The Phoneme Blending Test was not administered during the pre-test phase because the task demands exceeded the participant's current abilities. Overall, the pre-test findings revealed weaknesses in phonemic awareness, phoneme isolation, colour naming, and the automatization of verbal responses. Difficulties were also observed in task engagement and cooperation during more demanding activities, highlighting the need for targeted stimulation of phonological skills.

- **Post-Test (March 2026)**

In the Rapid Automatized Naming – Objects subtest, a substantial improvement was observed compared to the pre-test assessment. Participant M. progressed from the below-average range to the average range, indicating positive development in the rapid retrieval and naming of visual stimuli. Although the participant was still unable to name all colours using conventional colour labels, he successfully employed appropriate semantic associations (e.g., "like grass," "like a cloud," or "like a heart"). In the Rapid Automatized Naming – Colours subtest, percentile performance improved, but the most significant achievement was the participant's active cooperation and engagement throughout the assessment process. The administration of the Phoneme Isolation Test was modified through the incorporation of elements from Elkonin's Phonemic Awareness Training. Specifically, Participant M. identified the initial or final phoneme by selecting the corresponding articulatory "mouth stamp." Compared with the pre-test results, a marked increase in percentile performance was recorded. In the Phoneme Blending Test, Participant M. achieved a standard score within the average range. Given that the test could not be administered during the pre-test phase because of its complexity, this outcome can be considered a particularly important indicator of progress in phonemic awareness.

4. Discussion

The post-test findings suggest a positive effect of the implemented intervention. The most substantial progress was observed in phoneme isolation, rapid object naming, and overall cooperation during assessment procedures. Improvement was also evident in colour naming, although this skill had not yet become fully automatized. Another noteworthy outcome was the successful completion of the Phoneme Blending Test, which had not been feasible during the pre-test assessment. This finding indicates a significant enhancement in phonological processing skills and phonemic awareness. The integration of remediation activities targeting weakened partial functions, including colour recognition, mathematical concepts, and graphomotor skills, contributed substantially to the participant's overall development. This conclusion is supported by the improved post-test performance in the Rapid Automatized Naming – Colours subtest. The participant also demonstrated progress in mathematical abilities. By March 2026, he was able to count accurately from one to ten without errors. This improvement was independently confirmed by his educational audiologist, who reported that the child had mastered counting to ten successfully. Consistent with previous research (Mikulajová & Dujčíková, 2001, cited in Hrehová, 2013), the findings suggest that Elkonin's Phonemic Awareness Training not only enhances phonemic awareness but also provides children with speech sound disorders with a model of accurate pronunciation. Similarly, Werfel (2016), in a study examining phonological awareness in preschool children with cochlear implants and hearing aids, concluded that interventions are effective when they are sufficiently intensive, appropriately modified for children with hearing impairment, and based on an evidence-based intervention framework (Mikulajová, 2020). The findings should be interpreted with caution due to several limitations. First, the study involved only one participant, limiting the generalisability of the results. Second, no control condition was included. Finally, the intervention was

implemented in a home environment with active parental involvement, which may have influenced the outcomes.

5. Conclusion

The methodology of this qualitatively oriented case study was based on multiple sources of information, including a review of the participant's documentation, an unstructured interview with his mother, the preparation of a case study, and the implementation of Elkonin's Phonemic Awareness Training itself. The findings may provide practical guidance for speech-language therapists, special educators, educational audiologists, and parents of deaf and hard-of-hearing children. Based on the analysis and interpretation of the collected data, as well as the comparison of pre-test and post-test results, it can be concluded that Elkonin's Phonemic Awareness Training represents an effective intervention programme for supporting the development of emergent literacy skills and establishing the foundations necessary for successful reading and writing acquisition. Its significance lies not only in promoting academic achievement but also in reducing the risk of future learning difficulties. These findings are consistent with the results of numerous national and international studies that have demonstrated the positive impact of phonemic awareness development on later academic performance. Although a considerable body of research has examined the effectiveness of this intervention in general populations, studies focusing specifically on children with hearing impairment remain relatively scarce. The results of the present case study indicate that children with hearing impairment can achieve substantial progress in phonemic awareness when provided with appropriately designed and timely intervention. A crucial prerequisite is the systematic remediation of weakened functions, particularly auditory perception, auditory discrimination, and phonological processing. Early identification of deficits, combined with targeted professional intervention, may therefore significantly contribute to successful adaptation to school demands and support the child's overall educational achievement.

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