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SIMULATION-BASED TRAINING OF FUTURE SPECIAL EDUCATORS FOR PRONUNCIATION INTERVENTION WITH HARD-OF-HEARING CHILDREN

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Abstract: The increasing diversity of educational needs among hard-of-hearing children requires future special educators to acquire not only theoretical knowledge but also the ability to make appropriate professional decisions in complex pedagogical situations. Pronunciation intervention is particularly demanding because it involves the integrated analysis of auditory perception, articulation, phonemic discrimination, speech breathing, voice, rhythm, and intonation. This article explores simulation-based training as a practice-oriented approach to preparing future special educators for pronunciation intervention with hard-of-hearing children.

Keywords: simulation-based learning, special education, hard-of-hearing children, future special educators, pronunciation intervention, diagnostic reasoning, pedagogical decision-making, microteaching, professional training.

Professional activity in special education is characterised by situations in which a specialist must analyse several factors simultaneously and make an appropriate pedagogical decision. This is particularly relevant when working with children who are hard of hearing, since their speech development may vary considerably depending on auditory access, age of identification, language experience, amplification, educational support, family involvement, and individual developmental characteristics. Pronunciation development represents one of the areas in which professional decision-making becomes especially important. A special educator needs to determine not only which pronunciation difficulty is present but also what may contribute to that difficulty, which intervention objective should be prioritised, which sensory channels should be involved, and how progress should be evaluated.

Traditional university instruction provides future specialists with theoretical foundations concerning hearing impairment, speech development, and corrective education. However, knowing a method and selecting the appropriate method for a specific child are different professional abilities. Students may successfully reproduce theoretical definitions while experiencing difficulties when confronted with a real or realistic speech sample requiring immediate analysis.

Therefore, the professional preparation of future special educators requires educational environments in which students can repeatedly practise analysis, decision-making, intervention planning, and reflection without placing a child at risk of inappropriate pedagogical intervention.



Simulation-based learning provides such an opportunity. The purpose of this article is to substantiate the potential of simulation-based learning in preparing future special educators for pronunciation intervention with hard-of-hearing children and to propose a structured algorithm for its integration into university training.

Simulation-based learning can be understood as the modelling of professional situations in an educational environment in which students perform actions that approximate future professional practice.

Unlike conventional theoretical tasks, simulation requires the student to act within a specific professional context. The student does not simply answer the question, “What methods can be used to develop pronunciation?” Instead, the student is presented with a particular case and must decide:

What is the child's difficulty?

What additional information is required?

What should be addressed first?

Which intervention strategy is appropriate?

How can the effectiveness of the selected strategy be evaluated?

Thus, the central element of simulation is not reproduction of information but professional decision-making.

For future special educators, simulation may include audio recordings of children's speech, video fragments of corrective sessions, written clinical-pedagogical cases, simulated parent interviews, pronunciation assessment protocols, role-playing activities, and microteaching.

Such activities create an intermediate learning space between university classroom instruction and direct professional practice.

Pronunciation difficulties in hard-of-hearing children cannot always be interpreted solely as articulation problems. An inaccurate production may be associated with insufficient auditory discrimination, unstable phonemic representations, difficulties in articulatory control, limited auditory feedback, or insufficient automatisisation of the target sound in connected speech.

Consequently, a future special educator should avoid mechanically applying the same corrective exercise to every similar pronunciation error.

For example, when a student hears an inaccurate production of a particular consonant, the first pedagogical question should not necessarily be:

“Which articulation exercise should I use?”

A professionally oriented analysis requires several preceding questions:

Can the child hear and discriminate the target sound?

- Can the child differentiate it from acoustically similar sounds?
 - Can the child visually identify the articulation pattern?
 - Can the child produce the sound in isolation?
 - Does the error occur in isolation, syllables, words, or spontaneous speech?
- This shift from an exercise-centred approach to a diagnostic decision-centred approach is one of the key objectives of simulation-based preparation.

A Simulation-Based Training Algorithm

For university training, simulation activities can be organised according to six interconnected steps.

Stage	Student Activity	Professional Skill Developed
1. Case perception	Watches a video, listens to a speech sample, or studies a professional case	Focused professional observation
2. Problem identification	Identifies pronunciation and speech difficulties	Recognition and differentiation of difficulties
3. Diagnostic interpretation	Analyses possible causes and determines what additional information is required	Diagnostic reasoning
4. Pedagogical decision-making	Establishes priorities and selects an intervention direction	Independent professional decision-making
5. Intervention design	Selects exercises, materials, sensory supports, and expected outcomes	Methodological planning
6. Reflective evaluation	Compares decisions with feedback and identifies possible alternatives	Professional reflection

This algorithm differs from the traditional “explanation–exercise–assessment” structure because the starting point is a professional problem, not a theoretical topic.

Audio-based tasks are particularly useful for developing students' analytical listening skills.

A student may receive a short recording of a hard-of-hearing child's speech. Before receiving any detailed information about the child, the student is asked to identify observable characteristics.

The analysis may focus on: sound substitutions; sound omissions; distortions; voicing errors; syllable structure; speech rate; stress; hythm; intonation; speech intelligibility.

At the second stage, additional information about the child's hearing status, amplification, age, and language experience can be provided.

The student then revises the initial interpretation.

This two-stage procedure is important because it teaches students to distinguish between observation and interpretation. In professional practice, conclusions should



not be made before sufficient information has been obtained.

Video simulation provides information that cannot be obtained from an audio recording alone. Students can observe articulation, facial expression, visual attention, teacher prompts, use of gestures, teaching materials, and the child's response to different forms of support.

For example, students may watch a short corrective session and complete three tasks:

1. identify the pedagogical objective of the activity;
2. evaluate whether the selected method corresponds to the child's demonstrated difficulty;
3. propose an alternative strategy and justify it.

The third task is especially important. Students should understand that professional practice does not always have one predetermined solution. Different methods may be appropriate depending on the individual characteristics of the child.

Therefore, simulation should develop methodological flexibility, rather than memorisation of fixed algorithms.

Microteaching can be used after diagnostic case analysis.

A student prepares a short five- to ten-minute intervention fragment based on a simulated case. One participant performs the role of the special educator, while another participant follows a predefined child profile.

The remaining students observe the session according to specific criteria.

They may evaluate: clarity of the instructional objective; appropriateness of the selected task; sequence of pedagogical actions; use of auditory and visual support; quality of feedback; adaptation to the child's response; professional communication.

After the simulation, the student explains why particular decisions were made.

This explanation is essential because it makes professional reasoning visible. A student who can perform an exercise but cannot justify its selection has not yet fully developed methodological competence.

Feedback should not be limited to identifying mistakes. Its primary function should be to improve professional reasoning.

After completing a simulation, students can compare three perspectives:

Student perspective: Why did I select this method?

Peer perspective: What did observers notice?

Instructor perspective: What alternative professional decision could have been made?

The discussion can then focus on the relationship between diagnostic evidence



and the chosen pedagogical strategy.

A useful reflective structure may consist of four questions:

What did I observe?

How did I interpret it?

Why did I choose this intervention?

What would I change after receiving feedback?

This structure supports the transition from intuitive action to conscious and evidence-informed professional activity.

Simulation activities can also be organised through a digital professional portfolio.

During a university course, each student can gradually collect several types of tasks: analysis of audio speech samples; analysis of video cases; completed pronunciation assessment protocols; individual intervention plans; recorded microteaching sessions; instructor feedback; student self-reflection; revised versions of intervention plans.

The value of such a portfolio is not limited to assessment. It demonstrates how the student's professional reasoning develops over time.

For example, the first intervention plan may contain a general set of pronunciation exercises. A later plan may demonstrate more differentiated decision-making based on auditory discrimination, articulation, individual abilities, and communicative needs.

The comparison between initial and later tasks provides evidence of professional growth.

Simulation should not replace direct pedagogical practice. Its function is to prepare students for it.

A possible progression can be organised as follows:

theoretical knowledge → recorded case → structured simulation → microteaching → supervised work with a child → independent pedagogical activity.

At the beginning, students receive substantial guidance. The instructor may provide assessment questions, possible intervention alternatives, or structured observation protocols.

At later stages, this support should gradually decrease.

The student then independently identifies the problem, determines the required information, selects the strategy, implements the activity, and evaluates the outcome.

This gradual reduction of instructional support contributes to professional autonomy.



Assessment of Students in Simulation-Based Training

The assessment of simulation activities should focus not only on whether the student has selected the “correct” exercise.

Professional readiness can be assessed according to several indicators.

Assessment Indicator	Evidence of Student Performance
Observation accuracy	Identifies relevant pronunciation characteristics without unsupported conclusions
Diagnostic reasoning	Connects observed difficulties with possible contributing factors
Decision justification	Explains why a particular intervention direction was selected
Methodological appropriateness	Selects strategies consistent with the child's needs
Adaptability	Modifies the activity when the simulated situation changes
Reflection	Identifies strengths, limitations, and alternative solutions

Such assessment makes it possible to evaluate the process of professional thinking, not merely the final answer.

The preparation of future special educators requires more than increasing the number of theoretical subjects or practical hours. The critical issue is how effectively students learn to connect knowledge with professional action.

Simulation-based learning may provide an important mechanism for establishing this connection.

Its first advantage is repeatability. Students can analyse the same speech sample several times and focus on different aspects during each analysis.

Its second advantage is safety. Students can make incorrect decisions, discuss them, and revise their approach before independently working with a child.

Its third advantage is variability. The same pronunciation difficulty can be presented through cases involving children with different hearing profiles, language experiences, ages, and educational backgrounds.

Its fourth advantage is reflection. Simulation allows the professional decision-making process to be reconstructed and discussed after the activity.

However, simulation should be based on pedagogically valid and realistic cases. Artificial situations that provide insufficient context may lead students to search for a single predetermined answer instead of developing analytical thinking.

Another important principle is individualisation. Hard-of-hearing children represent a heterogeneous population. Therefore, simulations should demonstrate that similar observable pronunciation difficulties may require different pedagogical decisions.



Simulation-based pronunciation training can be incorporated into courses related to deaf education, special pedagogy, speech development, audiology, and methods of corrective teaching.

It does not necessarily require complex technological equipment. Initial simulations can be organised through carefully designed written cases, audio recordings, video fragments, role-playing, and structured observation protocols.

More advanced programmes may incorporate digital case libraries in which students access different child profiles and complete sequential diagnostic and methodological tasks.

A simulation module may therefore consist of four interconnected blocks:

Block 1 – Observe: identify relevant characteristics.

Block 2 – Analyse: interpret the professional problem.

Block 3 – Decide: select and justify an intervention strategy.

Block 4 – Reflect: evaluate the decision and consider alternatives.

This structure places the student in an active professional position and changes the instructor's role from information provider to facilitator of professional reasoning.

Simulation-based training represents a promising practice-oriented approach to preparing future special educators for pronunciation intervention with hard-of-hearing children.

Its main educational value lies not in reproducing real professional practice exactly but in providing students with repeated opportunities to observe, analyse, decide, act, receive feedback, and reflect.

The proposed six-step algorithm-case perception, problem identification, diagnostic interpretation, pedagogical decision-making, intervention design, and reflective evaluation - can serve as a methodological framework for organising simulation activities within special education programmes.

Audio cases can strengthen analytical listening, video cases can develop professional observation, microteaching can support methodological practice, and structured feedback can promote reflective decision-making.

Thus, simulation-based learning may function as a bridge between theoretical university instruction and direct work with hard-of-hearing children. Its systematic integration into undergraduate special education programmes can contribute to the development of future educators who are able not only to reproduce corrective methods but also to select, justify, adapt, and critically evaluate them in accordance with individual educational needs.

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