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FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES

DOCTORAL SCHOOL „EDUCATION, REFLECTION, DEVELOPMENT”

ABSTRACT OF DOCTORAL THESIS

**INVESTIGATING EMBODIED COGNITION THEORY IN EARLY
CHILDHOOD LANGUAGE EDUCATION APPROACHES**

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PART A. THEORETICAL CONSIDERATIONS

ARGUMENT

The theory of embodied cognition is an important paradigm in contemporary cognitive science research. This theory argues that body morphology, emotions and sensorimotor systems influence psychological processes. The research investigated how this theory could be applied to early language education approaches for young preschoolers.

Embodied cognition is based on the idea that cognitive processes are intrinsically linked to the body's sensorimotor experiences and social interactions. Through these processes, individuals form perceptions, develop knowledge and adapt their behaviour to their environment. Thus, early language education for preschoolers is not limited to the verbal aspects of language, but also includes sensory and motor experiences.

In the experimental research entitled „Investigating the formative and informative value of the application of the educational program «Integrated exploitation of sensory-motor stimuli» with a focus on the use of embodied cognition in the language education of young preschoolers” children were actively involved, and intellectual, verbal and affective interactions were established between them and the teacher. Through educational methods such as reading, storytelling, role-playing and speech therapy games, the aim was to develop vocabulary, correct pronunciation, coherent expression and the ability to communicate effectively in different contexts.

In conclusion, the research demonstrated that an effective educational approach, which values the principles of embodied cognition, could contribute to the improvement of young preschoolers' language skills. By actively engaging children in activities that stimulate both

cognitive and sensory/motor aspects of language, significant results in early language development and understanding can be achieved.

CHAPTER I

GENERAL CONSIDERATIONS ON EMBODIED COGNITION

I.1. Perspectives in the study of human cognitive processes

Human cognitive processes refer to the complex mental operations involved in understanding, processing and interpreting information from the environment. These include activities such as processing sensory data, analysing information, storing it in memory, generating ideas and forming logical reasoning. Cognitive processes are essential for adapting to the environment, perceiving the world, solving problems and making decisions.

The study of these processes contributes to our understanding of the workings of the human mind and to the development of theories that explain and model these processes. In this context, two main perspectives are distinguished: embodied cognition theory and theory of mind. Recent research confirms the existence and relevance of these theories, indicating the need for further study to explore their limitations and general applicability (Soliman & Glenberg, 2014; Watson & Chatterjee, 2011; Zwaan, 2014; Dove, 2016).

I.1.1. Theory of embodied cognition. Terminological delimitations

The Theory of embodied cognition is a current and growing theme that suggests the influence of physical body characteristics on cognition.

„Human cognition, in its dual role as knowledge-process (knowledge) and knowledge-product (knowledge), must be reliable, providing explanations and predictions on which we can rely. Thus, on the one hand, we have the activity of knowledge, generated in turn by the need for knowledge of individuals and communities, and on the other hand, knowledge objectified in „knowledge”, with its attributes of truthfulness, authenticity and usefulness” says Frumos (2023, pp. 18-19).

Recent research confirms the importance of embodied cognition, removing doubts about its existence and highlighting the need for further study to answer future questions (Soliman et al., 2014; Watson & Chatterjee, 2011; Zwaan, 2014). According to this theory, cognitive processes

and emotions evolve within sensory-motor experience (Prince et al., 2012), and the boundaries between mind, body and environment dissolve.

Learning, in the context of embodied cognition theory, involves engaging the body with the proximal environment through sensorimotor mechanisms (Alibali & Nathan, 2012). The body is both an agent and an expression in social interactions (Alexias & Dimitropoulou, 2011), its social dimension being inseparable from its biological one. Gallagher (2005) points out that embodied cognition theory defines the self as an embodied self, and Lakoff (2012) and Alibali & Nathan (2012) detail how perceptions and sensorimotor skills shape human cognition.

I.1.2. Theory of mind. General aspects

Theory is „a systematic set of concepts, ideas, reflections, hypotheses, laws, explanatory models that describe, define, explain and generalize facts or events concerning certain domains or categories of phenomena” (Bocos et al., 2021a). Theory of mind is considered a theory because thoughts and feelings manifested by the mind are the only directly observable aspects, facilitating the inference of the existence of a mind.

Defined as a distinct component of social thought (Rowe & Wright, 2001; Havet-Thomassin et al., 2006), theory of mind is the cognitive ability to be aware that others have distinct mental states, including thoughts, beliefs, intentions, and desires, allowing for the inference and anticipation of their actions and empathy. Empathy, a term attributed to the German philosopher Robert Vischer (1847-1933), is the mental process by which a person senses and understands the states, thoughts and actions of others.

Since the early 1980s, interest in theory of mind has grown, described as a „theory” because the behavior of others is the only directly observable thing (Premack & Woodruff, 1978). It allows individuals to attribute thoughts, desires and intentions to others, and to predict or offer explanations for their actions.

Studies have shown that possessing a functional theory of mind is essential for success in social interactions (Bibby & McDonald, 2005; Havet-Thomassin et al., 2006). Theory of mind involves perceiving and assuming a perspective: identifying facial expressions and body language, and being able to put ourselves in someone else's shoes.

In preschool, children begin to use mental terms and perceive notions about beliefs and representational mental states (Bretherton & Beeghly, 1982; Wellman & Estes, 1986). By age three, they can recognize distorted beliefs and explain actions in terms of them (Siegal & Beattie, 1991; Moses & Flavell, 1990).

Frith and Frith (2005) demonstrate the importance of theory of mind with an experiment in which subject Max searches for his chocolate in its original location, unaware that it has been moved. Interpreting his behavior in terms of his erroneous knowledge demonstrates the use of theory of mind.

Thus, theory of mind helps to interpret individuals' behavior by attributing mental states, including beliefs, intentions, desires, and emotions.

I.2. Concepts derived from the theory of embodied cognition. Clarification of the terminological framework

Embodied cognition theory argues that cognitive processes are deeply interconnected with the body and interactions with the environment. This suggests the idea that thinking and cognition do not take place in isolation in the brain, but result from complex interactions between the brain, body and external environment. Therefore, sensory experiences, physical movements and the context in which the individual acts play a crucial role in the formation and manifestation of human thought and behaviour.

Two main concepts derive from this theory: embodied cognition and embodied learning.

Embodied cognition describes the cognitive acquisitions achieved by fully involving the organism in interactions with the environment. It involves sensory-motor, affective-emotional, cognitive and metacognitive components, all interconnected with physical, social and cultural aspects of the environment.

Embodied learning refers to the active engagement of learners in interacting with educational content and instructional tasks, using senses and movement to facilitate learning.

Thus, embodied cognition theory emphasizes the importance of context and direct experiences in cognitive development.

I.2.1. Embodied cognition

Embodied cognition is an expanding field of research, emphasizing the essential link between sensorimotor systems and cognitive processes for understanding cognitive processes, contrary to the traditional view that considers them distinct. Cognitivism, developed in the 1950s and 1960s, focused on information processing, seeing cognition as a mediator between perception and action through symbols (Baddeley, 1988; Duncan, 2006; Medin, 1989; Nosofsky, 1991).

Ionescu (2011) stresses the importance of clearly defining the term 'cognition' before adopting the embodied cognition perspective. Calvo and Gomila (2008) describe cognition as a higher level between perception and action. The embodied cognition approach argues that cognitive processes are deeply influenced by the body and interaction with the environment (Barsalou, 2008a; Glenberg, 2010).

In recent studies, Watson (2014) has shown that the embodiment process can be gradual and context-dependent. Dove (2015) and Shapiro (2014) discuss the challenges of approaching embodied cognition with respect to abstract concepts. Prince et al. (2012) and Zatti & Zarbo (2015) highlighted the fundamental role of body movements in influencing cognitive processes, supporting embodiment theory.

In education, the embodied cognition approach encourages children's multisensory interaction with the environment. This approach emphasises that emotions, sensorimotor processes and interaction with the environment play a crucial role in cognitive development.

I.2.2. Embodied learning

„In a broad sense, learning is considered either a process of acquiring new experiences, new skills, abilities, competences and new forms of behaviour, or of modifying, restructuring or changing existing ones, in order to make the best possible adaptation of the individual to new situations and to the accentuated dynamics of life” (Bocos et al., 2021b).

Claus (1977) defines learning as a „conscious processing of information by which the organism subjectively reproduces objective structures characteristic of the environment” (apud I. Cerghit, 2008).

Embodied learning focuses on using the body and senses to actively interact with the environment, stimulating critical thinking and creativity. This concept is supported by studies showing the influence of motor and sensory factors on cognitive development (Morse et al., 2015; Needham et al., 2002).

The ecological model of learning recognises the diversity of developmental pathways and the need for a transformation in educational strategies to promote authentic and relevant student adaptation. This model is based on experiential learning, projects and investigations, emphasizing the importance of cognitive, sensory, motor and emotional engagement (Ionescu & Glava, 2015).

The principles of experiential learning are integrated into preschool and primary school curricula in Romania, emphasizing student control over learning, reflection, and the quality of learning relationships. In conclusion, educational institutions should adopt strategies that encourage embedded learning for all age groups.

I.3. Referential contributions to the development of embodied cognition theory

Embodied cognition theory examines the interconnections between mind, body and environment in cognitive processes, emphasizing the importance of sensory and motor experiences in the development of thought and perception. Research in the field has demonstrated how the brain processes sensory information and responds to motor actions, highlighting the influence of the environment on cognition.

This theory explores the collaboration of the senses in forming a unified perception of reality, with studies of visual and auditory perception showing the integration of information from multiple sources for a coherent picture of the world.

Significant contributions to embodied cognition theory have been made by researchers such as George Lakoff, Mark Johnson, Francisco Varela, Evan Thompson, Eleanor Rosch, Esther Thelen and Andy Clark.

I.3.1. George Lakoff and Mark Johnson – the use of metaphors to construct abstract meanings

George Lakoff and Mark Johnson have made a significant contribution to the theory of embodied cognition, emphasizing the use of metaphors in constructing abstract meanings. In *Metaphors We Live By* (1980), they argued that metaphors are not just linguistic figures of speech, but fundamental ways of thinking and understanding the world. Metaphors are embedded in our bodily experiences and help us understand abstract concepts through physical interactions.

For example, the metaphor „time is space” is reflected in expressions such as „we are approaching the future” or „the past is behind us”. Embedded metaphors are so integrated into language and thought that we are no longer aware of them as metaphors. They shape our perception and communication, as in expressions such as „a good mood” or „I fought for my idea”.

Lakoff and Johnson have redefined the relationship between language, body and cognition, highlighting that bodily experiences influence abstract meanings and how we think and communicate. Thus, language and thought are deeply connected to our physical experiences.

I.3.2. Francisco Varela, Evan Thompson and Eleanor Rosch – on the construction of words

Francisco Varela, Evan Thompson and Eleanor Rosch are three important figures in cognitive science and philosophy who have contributed significantly to the development of theories of human perception, consciousness and understanding. Their work has had a profound impact on how we approach complex questions about the nature of the mind and human experience, and has been of significant importance in the development of embodied cognition theory.

Varela, Thompson and Rosch challenge the traditional view of cognition as simply the computation of representations and opt to perceive knowledge as embodied action (Shapiro, 2019). Francisco Varela, a Chilean neurobiologist and philosopher, was one of the founders of neurophenomenology, exploring the connection between subjective experience and brain activity.

Evan Thompson, a Canadian philosopher and researcher, worked closely with Varela, helping to develop the concept of „embodiment” in philosophy and cognitive psychology. He

emphasised the importance of anchoring human understanding in interaction with the environment.

Eleanor Rosch, an American cognitive psychologist, is known for her research on categories and concept structures. She proposed the concept of „prototypes” in categorization, pointing out that not all elements of a category are equal, and that categories are influenced by context and perspective.

Their perspectives on the construction of words make distinct contributions: Rosch with prototype theory, Varela with the subjective nature of words in neurophenomenology, and Thompson with the concept of „embodiment” of word meanings. These complex approaches contribute to a deeper understanding of how human language is constructed and used to communicate and understand the world.

I.3.3. Esther Thelen – the impact of bodily experiences on the configuration of knowledge

Esther Thelen, a renowned specialist in early human development, has revolutionised our understanding of the process of motor and cognitive development in infants and young children. Her work on 'developmental dynamics' has changed the way we look at children's development in the early years. She emphasised that development cannot be understood simply by looking at isolated stages, but needs to be seen in a broader context of complex interactions between motor, cognitive and environmental factors.

Thelen highlighted the close interconnection between motor and cognitive development, showing that learning to walk, for example, reveals much about how children develop their motor skills and understanding of the world. Her insights have influenced the way we research and develop children's learning and development in the early years, highlighting the importance of active interactions with the environment and sensory-motor exploration.

Thelen emphasised that bodily experiences are central to the construction of human cognition, and that motor and cognitive development are closely linked. This paved the way for an integrated approach to learning, promoting experiential learning and active engagement of the body in the learning process. Through his work, Thelen has significantly influenced progress in

child development and the evolution of learning and cognition processes, highlighting the importance of bodily experiences in cognitive development.

I.3.4. Andy Clark – influences of the body and the physical environment on cognitive processing

Andy Clark, an influential philosopher of cognitive science, developed the theory of embodied cognition, pointing out that the mind is not separate from the body and the environment, but is interconnected with them in a dynamic and integrated way. He highlighted the importance of the influences of the body and the environment in the cognitive process, arguing that cognition is shaped by our interactions with the environment.

Clark promoted the concept of 'embodied simulation', arguing that understanding and interpreting other people's experiences is based on simulating in our minds our own sensory and motor experiences. He also highlighted the phenomenon of „cognitive externalisation”, arguing that the use of external tools and technologies expands our minds and allows us to process information efficiently. Thus, Clark's theory stresses that cognitive processes are distributed and embedded in our ongoing interaction with the physical environment.

I.4. Embodied cognition – perspectives in philosophy of mind and cognitive science

Embodied cognition is an important paradigm in philosophy of mind and cognitive science that is changing the way we understand human cognitive processes. This perspective argues that the mind cannot be understood in isolation from the body and the environment, but involves a close interaction between these components. Key aspects of embodied cognition include mental expansion, embodiment of body, context and environment, distributed understanding and ecological approach. These aspects highlight the importance of the interconnection between mind, body and environment in cognitive processes, highlighting the extensive role of external factors and the influence of the environment on human perception and thinking.

I.4.1. The role of the body in cognition – variability in how we perceive and understand the world

The human body plays an essential role in the process of knowing and understanding the world around us. Through our sense organs, such as our eyes, ears and skin, we gather information from our environment and transmit it to our brain for processing. This perception process is influenced by our body and the way we interact with our environment. As Casasanto (2009) states, there are differences in the way people with different body features perceive and process information, which can affect how thoughts and feelings are represented in the brain. Experiments by Willems et al. (2009, 2010) found that brain activity when reading or imagining actions is influenced by body laterality. Thus, the body is not just a passive receiver of information, but plays an active role in how we interpret and process the world around us.

I.4.2. The influence of bodily experience on moral conduct

Embodied cognition profoundly influences the moral conduct of individuals through sensations, emotions and physical experiences. Bodily experience affects moral behaviour through empathy, pain and pleasure, body awareness, mental health and moral judgement.

Empathy, generated by bodily experiences, makes us more likely to adopt moral behaviour, better understanding the suffering of others. Pain or pleasure also influences moral decisions; those who have experienced pain may be less likely to cause suffering to others. Self-awareness and mental health play important roles: those who feel good in their bodies and have good mental health are often more likely to adopt moral behaviour. Physical condition, such as fatigue or hunger, can affect the ability to make moral decisions.

Morality is seen as an expression of values guided by reason, as opposed to bodily cravings and desires. „The specificity of the assessment of ethical behaviour implies a gradual shift from an assessment in relation to certain contents to an assessment in relation to certain formative objectives and specific competences” (Răduț-Taciu, Bocoș & Chiș, 2015, p. 457).

Emotions and bodily experiences, such as disgust, influence ethical behaviour. Disgust, originally linked to taste, now functions as a guide to avoid social dangers and moral transgressions

(Rozin, 1999). Borg, Lieberman & Kiehl (2008) have shown that physical and moral disgust use overlapping brain regions.

Embodied cognition suggests that reason and bodily inputs are closely linked. The human body is not just a „housing” for the brain, but an integral part of how we think, feel and act morally. Understanding the mind-body connection helps to develop a deeper perspective on moral motives and to promote healthier and more responsible ethical conduct in society.

I.4.3. Synergy between body movements, sensorimotor experiences, mental simulations and emotions in embodied cognition

Embodied cognition, a paradigm in neuroscience and cognitive psychology, argues that mental processes are strongly influenced by the body and its interactions with the environment. Body movements, sensorimotor experiences, mental simulations and emotions work together to shape cognitive processes and human behaviour.

„The body is our most important brain” (Sacks, 2021). Movement, from simple gestures to complex activities, acts as a cognitive tool, being associated with perception, attention and memory. Sensory-motor experiences, such as touching an object, are starting points for cognitive processes, feeding mental simulations that help us anticipate and understand the world.

Embodied cognition suggests that consciousness is based on sensorimotor experiences. Body movements are essential for learning, and physical state can affect thinking and decisions. „Our sensory and motor experiences are our coloring books of life” (Wolpert & Landy, 2012).

Emotions, generated by sensory-motor experiences and mental simulations, significantly influence moral decisions. They can guide altruistic or selfish behaviour. „Emotions give us important information about the influence of situations on our well-being” (Selvam, 2023).

According to Selvam (2023, p. 56) „the embodiment of an emotion can be defined as the ability to dilate the emotional experience to as large a part of the body as possible, so that the person's ability to tolerate the emotional experience and to stay with it grows”.

The synergy between body movements, sensory-motor experiences, mental simulations and emotions influences the way we understand and experience the world. „The formation of moral conduct means the interrelated action on the following behavioral structures: moral skills, moral habits, moral will, and character” (Cucoş, 2014, p. 101).

In conclusion, embodied cognition highlights the interdependence between mind and body, highlighting the importance of integrating this perspective in researching human behavior and understanding human nature. It opens new horizons for the study of cognition and mental, affective and behavioural life.

CHAPTER II

THEORETICAL PERSPECTIVES ON EARLY CHILDHOOD LANGUAGE

EDUCATION ACTIVITIES

II.1. Early childhood curriculum. Multidimensional coordinates

The curriculum refers to the school's educational provision and encompasses the learning experiences offered to learners in formal, non-formal and informal contexts. „The curriculum for early education aims at the full, free and harmonious development of the child from birth to the age of 6-7 years,” states Bocos & Jucan (2022, p. 33). It focuses on individually adapted learning, taking into account the pace and needs of each child.

The new 2019 early education curriculum has been developed to bring coherence and unity, with a focus on building key competences from an early age. „The new early education curriculum aims to provide a comprehensive framework to support the holistic development of children at an early age” (Anghelache et al., 2022, p. 47). It is competency-focused, focusing on developing the behaviours and skills needed to build a solid foundation.

Competence is defined as „an integrated set of knowledge, skills and attitudes” (Curriculum for Early Education, 2019, p. 14). The curriculum for early education is based on the goals formulated in the „Fundamental Benchmarks in Early Learning and Development” (RFIDT, 2010), which address five areas of development: physical, social-emotional, cognitive, language and communication, and attitudes in learning.

Learning activities are planned and systematic, involving teachers, parents and collaborators from the educational community. They encourage children's initiative, stimulate learning through experimentation and the exercise of individual skills. The new curriculum promotes a child-centred learning model, emphasising the importance of interactions between educational content and teaching methods.

„The curriculum for early childhood education from birth to age 6 is based on a set of goals” (Curriculum for Early Childhood Education, 2019, p. 3) to support children's full development. Collaboration between educators and parents is key to achieving the curriculum goals and preparing children for future challenges.

II.1.1. Development domains. Developmental domain of language, communication and literacy

According to Anghelache (2022, p. 15), „formal education carried out in kindergarten is a set of conscious, planned, deliberate and systematic actions aimed at ensuring the bio-psycho-social development of the preschool child.”

Child growth and development are interconnected processes. Doron & Parot (1999, p. 199) define growth as „the development of the biological characteristics of a living being from birth to maturity”, while development is "the totality of irreversible transformations occurring in nature and society, which lead to a qualitative change in an upward direction, despite the moments of regression they comprise" (Popescu-Neveanu, 1978, p. 195).

The areas of development are interdependent, with progress in one area influencing the other. For example, gross motor development is linked to the development of sensory, social and emotional skills.

Language is considered a complex communication system based on arbitrary symbols (Lee & Das Gupta, 1997). Language development includes learning sounds, words, grammatical structure and using them to communicate. The development of nonverbal and verbal communication skills is essential for social relationships and later school success.

Significant contributions to the understanding of language development and communication have been made by Piaget, Vygotsky, Bruner and Ferreiro. Piaget identified the main stages of cognitive development, Vygotsky stressed the importance of social interactions, Bruner highlighted the role of language in cognitive development, and Ferreiro studied the stages of understanding and using writing.

In conclusion, the development of language, communication and the prerequisites of reading and writing are interlinked aspects that influence the overall development of children, and early education plays a crucial role in this process.

II.1.2. Experiential domains. Experiential domain Language and communication

Experiential domains have been called „true «integrated cognitive fields» (L. Vlăsceanu) that transcend the boundaries between disciplines” (Curriculum for Early Childhood Education, 2008, p. 9; Bocoş et al., 2021c; Răduţ-Taciu et al., 2015, p. 113). These domains serve both as tools for achieving educational goals and for measuring child development (Curriculum for Early Childhood Education, 2008).

Activities by experiential domains (EDA) are planned according to curriculum principles and children's needs, including games, educational activities, exercises and experiments. The experiential domains include the Language and Communication domain, the Science domain, the Aesthetic and Creative domain, the Human and Society domain, and the Psychomotor domain (Early Education Curriculum, 2019). In particular, the Language and Communication domain focuses on developing language and communication skills through games, discussions, stories and interactive activities, preparing children for school and everyday life.

II.1.3. Developmental dimensions subsumed under the domain of Development of language, communication and prerequisites for reading and writing

The Curriculum for Early Childhood Education (2019) highlights the importance of the area of Language Development, Communication and the Prerequisites for Reading and Writing, dividing it into three main dimensions: „1. Oral messages in familiar communicative contexts; 2. Oral messages in different communication situations; 3. Reading and writing premises in known communicative contexts.” These dimensions emphasise the development of oral communication skills and preparation for reading and writing.

The Curriculum for Early Education (2019) emphasizes the importance of the domain Development of language, communication and the premises of reading and writing, highlighting three main dimensions: „Oral messages in known communication contexts,” „Oral messages in various communication situations,” and „Reading and writing premises in known communicative contexts.” These cover the skills of receiving and expressing oral messages and the preparation for reading and writing. The domain is essential for the development of pre-schoolers, providing fundamental skills for oral and written communication in familiar contexts.

II.1.4. Behaviours associated with the Development of language, communication and the prerequisites of reading and writing dimension

The development of language, communication and reading and writing skills is a complex and intense process that begins at birth. Children learn different aspects of language, such as sounds, words, grammatical structures and word meanings, with continuous support from adults and the community. These subdomains, Language and Communication Development and Reading and Writing, are closely linked and develop in parallel.

The behaviours associated with these dimensions have a significant impact on children's development and in the development of their cognitive and social skills. Children learn to produce sounds, words and sentences and then use them to communicate with others. Over time, they learn to listen, answer questions and actively participate in conversations. Developing a rich vocabulary is essential for communication and for the further development of reading and writing skills.

Before learning to read and write, children go through a pre-literacy process, which includes developing phonemic awareness, vocabulary and language, as well as familiarity with letters and numbers. The healthy development of these dimensions is crucial to children's success at school and work.

II.2. Multidimensional analysis of early language development

Language development in the early pre-school years is a fascinating and complex process that profoundly influences the child's development. Children develop auditory perception and language comprehension skills, recognising sounds and associating them with words and objects. Their vocabulary expands rapidly and they begin to understand and interpret non-verbal language. In addition to words, children begin to understand grammatical structures and express their thoughts and feelings through words (Dukes & Smith, 2010).

In early preschool, children begin to process complex sentences and follow detailed instructions. They learn grammatical rules and develop expressive and responsive communication skills (Verza & Verza, 2017). During this period, children begin to interact more with others and express their identity and individuality through language.

Language development in the early preschool years is critical to a child's development and preparation for the future. This period provides the basis for the language and communication skills they will use throughout their lives.

II.2.1. Phonetic/phonological level

In the preschool period, children develop significant phonetic abilities, influencing the intelligibility of the message and the paraverbal elements of communication (Golu, 2009). Correct pronunciation is essential at this stage, and children make varying degrees of progress in this regard, needing adult support for correction. To develop understandable messages, it is important to use simple language and to use examples or illustrations for clarity (Muntean, 2006).

The degree of speech intelligibility increases with age, with an estimated 98% of speech at 4 years of age being intelligible (Muntean, 2006). Paraverbal elements such as rhythm, intonation and voice pitch are also crucial in communicating with preschoolers and can influence their understanding and receptiveness (Muntean, 2006).

II.2.2. Lexical-semantic level

The lexical-semantic level of preschoolers refers to the knowledge and use of words, as well as the understanding of their meanings (Slama-Cazacu, 1999; Şchiopu, 2008; Monteiro et al., 2022; Babineau et al., 2021). Preschool children are constantly learning new words and using them to express ideas and feelings (Slama-Cazacu, 1999).

As they learn new words, children develop a deeper understanding of their meanings and learn to associate them with objects, actions and concepts (Slama-Cazacu, 1999; Şchiopu, 2008). Vocabulary development is facilitated by interaction with real-world objects and concepts and is essential for communication and understanding of the world around them (Varzari et al., 1971).

Lexical-semantic development is an individual process and can vary from child to child. Positive verbal interaction and stimulation are essential to support this process (Slama-Cazacu, 1999; Şchiopu, 2008; Monteiro et al., 2022; Babineau et al., 2021). Thus, the lexical-semantic level of preschool children is in a continuous development and expansion (Slama-Cazacu, 1999; Şchiopu, 2008; Monteiro et al., 2022; Babineau et al., 2021).

II.2.3. Morphological level

The preschool period is characterised by the first attempts to communicate according to grammatical rules (Harwood, 2010). Pre-school children begin to use the noun, verb and adjective, adapting them to age-specific features and individual contexts (Golu, 2009).

At this level, they develop morphological skills, learning and applying the grammatical rules of their mother tongue (Harwood, 2010). They begin to use personal pronouns and verbs to form more complex sentences and understand the formation of verb tenses (Golu, 2009).

Although it is normal for grammatical errors to occur, interaction with adults and other children in their environment plays a key role in correcting these errors (Harwood, 2010). Reading together and conducting interactive language activities are effective ways to support the development of morphological skills (Golu, 2009).

Thus, morphological development in preschool children is a gradual and individualized process that can be enhanced through interaction, reading, and language games (Harwood, 2010; Golu, 2009).

II.2.4. Syntactic level

The syntactic level of language development in preschoolers focuses on their ability to use and develop complex grammatical structures and sentence construction rules (Muntean, 2006; Golu, 2009; Şchiopu, 2008; Harwood, 2010).

In the preschool period, children progressively improve their syntactic skills, moving from simple to more complex sentences that include subjects, verbs and complements (Muntean, 2006). They learn to use conjunctions to connect sentences and to use verb tenses correctly to express past, present or future actions (Harwood, 2010).

Although syntactic errors can occur, such as reversing words in sentences or incorrect grammatical agreements, these are normal and tend to correct themselves as children learn (Golu, 2009). By providing opportunities for interaction and discussion, reading stories, and gently correcting errors, adults can help preschoolers develop correct syntax (Muntean, 2006; Harwood, 2010).

II.2.5. Stylistic level

The stylistic level of the Romanian language in preschool is marked by the development of language and communication skills of young children (Hobjilă, 2023).

At this stage, children begin to expand their vocabulary and use simple words to express their needs and thoughts (Hobjilă, 2023). They learn to use pronouns and create simple sentences, showing impressive creativity in language (Hobjilă, 2023).

Preschoolers are also working on developing correct pronunciation and simple grammar rules, but may still make errors in this regard (Hobjilă, 2023). At this age range, understanding of Figurative language begins to develop, and quality literary works and drawings contribute to this development (Hobjilă, 2023).

In conclusion, the stylistic level in preschool is characterized by the development of language and communication skills, and adults play an important role in supporting and encouraging this process (Hobjilă, 2023).

II.3. Traditional early childhood language education activities versus embodied cognition language education activities. Theoretical foundations

The concept of embodied cognition, introduced in the 1970s and 1980s, highlights the deep connection between psychological processes and the body, emphasizing the importance of sensory-motor experiences in learning and cognition (Glenberg, 2010; Price et al., 2012; Winkielman et al., 2015). This concept brings to the fore the influence that body morphology, the sensorimotor system and emotions have on mental processes (Glenberg, 2010).

In the context of early childhood education, embodied cognition approaches represent a significant alternative to traditional methods. These approaches emphasize children's active engagement with the environment and the use of sensory-motor experiences in language learning (Fuchs & Schlimme, 2009). In comparison, traditional methods are more theory-centered and do not use connections between words and sensory experiences (Glenberg, 2010).

Thus, in early childhood education, activities based on embodied cognition encourage active interaction, use of the senses, and engagement with the body to facilitate language learning

and understanding (Glenberg, 2010). These activities offer an integrated approach to language development, with the potential to more effectively stimulate young children's cognitive processes.

II.3.1. Traditional language teaching activities

In the kindergarten setting, educators focus on nurturing and developing children's language through a variety of activities, such as storytelling, conversations, and picture-based reading (Boca-Miron & Chichişan, 2002). The 2019 Early Childhood Curriculum provides guidance for these activities, emphasizing the importance of the close connection between language and the thinking process (Stan, 2010).

„By language is meant not only vocabulary, but also a certain meaning attributed to words” (Bocos et al., 2021d, p. 1071). Traditional practices, focused on improving oral communication skills, remain essential in early childhood education, even if modern and innovative methods have been introduced in recent years (Boca-Miron & Chichişan, 2002).

II.3.2. Embodied cognition language teaching activities

Language education activities involving embodied cognition are based on the idea that learning language and knowledge about the world is a complex process in which the body and the environment have a key influence on the development of thinking and language. According to the „embodied cognition” perspective, intelligent behavior is strongly influenced by how conceptual cognitive operations are integrated in a given context, between the individual's body and the environment (Glenberg, 2010; Price et al., 2012; Winkielman et al., 2015; Fuchs & Schlimme, 2009). These activities are effective because they actively engage preschoolers in simulating real actions and allow them to understand the world around them in relation to practical experiences (Manea & Bocos, 2023). Through them, language development is primarily aimed at, as children learn to describe and express what they experience and understand concepts through language.

CHAPTER III

PSYCHO-PEDAGOGICAL ISSUES OF EMBODIED COGNITION ACTIVITIES IN THE PROCESS OF LANGUAGE EDUCATION IN YOUNG PRESCHOOL CHILDREN

III.1. Aspects influencing the development of embodied cognition language teaching activities

Language education through embodied cognition involves integrating physical and sensory experiences into language learning, building on the connection between body and language. Activities of this type involve using the senses to experience language words and concepts, such as using physical objects to understand abstract concepts (Cucoş, 2014).

The context in which these activities take place can significantly influence the language education process, facilitating understanding in a deeper way through exploration, interaction and experimentation (Cucoş, 2014).

Social interaction also plays a key role, providing opportunities to use and practice language in an authentic context (Cucoş, 2014).

In these activities, it is important to take into account children's individual interests and preferences in order to stimulate their motivation and involvement in the learning process (Cucoş, 2014).

Thus, the conduct of these activities is shaped by various influences and aspects, including movements, sensory-motor experiences, mental simulations, emotions, environment, social interaction, personal motivation, available resources, adult support, activity planning, evaluation and constant adjustment.

III.1.1. The role of movement in the process of embodied cognition

Studies on how we perceive emotional expressions show that imitating movements is crucial for distinguishing between genuine and fake smiles (Niedenthal et al., 2010).

Research in object processing shows that movements are central to understanding objects, with anticipation of how they can be manipulated being crucial (Tucker & Ellis, 1998).

Body movements are fundamental to activities that rely on embodied cognition, aiding language learning and development through tactile and kinaesthetic experiences.

The use of movement in learning facilitates strong connections between the content being learned and physical experiences, which contributes to better comprehension and retention of information.

III.1.2. The effect of sensory-motor experiences on the development of embodied cognition

Embodied cognition highlights the close link between cognitive processes and an individual's sensory-motor experiences (Oates & Grayson, 2006). This perspective argues that we cannot separate cognitive processes from our sensory and motor experiences, influencing how we think and solve problems.

In addition, metacognition, the ability to reflect on our own cognitive processes, plays a crucial role in understanding and regulating our thoughts (Răileanu et al., 2021). It serves as an internal communication channel between our knowledge, our mental processes and our cognitive goals, contributing to the improvement of cognitive abilities.

Sensory-motor experiences are essential in carrying out embodied cognition activities (Răileanu, 2021). By directly engaging the body and senses in learning, individuals can benefit from a more effective and engaging educational experience, promoting the development of problem-solving and social collaboration skills.

III.1.3. The role of mental simulations in embodied cognition language training

Mental simulations play a crucial role in embodied cognition language training activities, according to studies in cognitive linguistics (Lakoff, 1990). They allow children to create vivid images of communicative situations, thus facilitating a deeper understanding of language and its meaning.

By actively involving children in mental simulations, they not only learn about language, but also interact, imagine and simulate verbal or nonverbal actions. This helps them to explore and experiment with different ways of using language in different contexts, contributing to the development of creative expression skills and adaptability in communication.

Mental simulations strengthen the link between abstract language and concrete everyday situations, thus facilitating understanding and effective use of words in a variety of contexts (Lakoff, 1990). Through active participation in mental simulations, children become more emotionally and cognitively engaged in language learning, which can increase their motivation and desire to develop in this area.

III.1.4. The effect of emotions on the development of embodied cognition language training activities

Emotions play an essential role in embodied cognition language education activities. According to Sillamy (1996), they are broad bodily responses that can vary in intensity and can significantly influence learning. Positive emotions, such as enthusiasm and joy, can increase motivation and engagement in learning, according to Selvam (2023). They can also influence memory and information retention, facilitating the process of recall and recognition.

In embodied cognition activities, emotions can contribute to the development of communication and emotional expression skills, helping children to regulate their emotions and manage stress or anxiety. Through social interactions in these activities, children can develop important social skills such as communication and empathy, according to Selvam (2023). Thus, understanding and managing emotions can maximize the benefits of these pedagogical methods, contributing to more effective and deeper language learning.

III.2. Teaching methods that can be used to educate young preschoolers' language through embodied cognition activities

Language education in kindergarten, through embodied cognition activities, plays an essential role in the development of young children's language skills. These interactive and engaging activities involve using the whole body and physical experiences to help children develop vocabulary, grammar and communication skills in a natural and fun way. Through role-playing, singing, dancing, puppet theatre and hands-on activities in the environment, children can enrich their vocabulary, understand the structure of language and learn to express themselves in varied

and engaging ways. These educational methods enhance the physical and interactive experience, making learning more engaging and memorable for children.

III.2.1. Reading the teacher

Educators and teachers play a key role in promoting reading to preschool children, using various types of stories and reading activities as teaching aids. These are integrated into teaching practice to activate children and encourage them to explore the world of books. According to Baciú, Bocoş & Verdeş (2022a), „The teacher's reading is a didactic means of exploiting in educational contexts the different types of stories (story created by authors of children's literature, the teacher's story, the story created by the teacher or the story created by children/pupils), and at the same time activating the learners” (p. 28).

Reading aloud, organising reading sessions in the classroom and using creative activities and book-based games are effective ways of developing reading skills and stimulating children's imagination and creativity.

„We read to children for the same reasons we talk to them: to reassure them, to entertain them, to form a bond with them, to inform or explain something to them, to arouse their curiosity and inspire them. But when we read aloud to them, we also do something else: we build their vocabulary, we condition their brains to associate reading with pleasure, we build their background knowledge, we become through them a role model for reading, we instill in them a desire to read” (Trelease, 2021, p. 30). It is essential for the educator to be a positive role model for reading and to create a pleasant and participatory atmosphere during reading activities. By following methodical requirements and recommendations, the educator can design and carry out reading in an appropriate way, adapting to the individual needs and interests of children.

Through dedication and creativity, the educator can make the reading experience memorable and beneficial for preschool children.

III.2.2. Reading from pictures

„Picture reading is a means of carrying out language education activities specific to preschool education, of exercising thinking and creativity, involving the use of illustrations,

pictures, paintings, etc., which usually suggest the unfolding of a story or depict different scenes, landscapes and characters” (Bocos et al., 2021e).

The stages of this activity include careful observation of the images and the development of skills in receiving and expressing the messages associated with them (Mara, 2012). Especially for children who cannot read, images play a crucial role in facilitating their understanding of the message and stimulating their expression (Hobjila, 2023).

The didactic steps for carrying out this activity include the preparation of the instructional approach, the pre-reception of the pictorial support, the actual carrying out of the reading according to the images and the contextualization of the message associated with these images. Through this method, pre-school children have the opportunity to develop their cognitive and communication skills in an engaging and interactive way.

III.2.3. Storytelling

Baciu, Bocos & Verdeş (2022a) emphasize the crucial role of storytelling in early education, highlighting its ability to convey knowledge and emotions, thus facilitating the achievement of educational goals. Storytelling is essentially integrated in the activities of the Language and Communication Domain and the Human and Society Domain according to the „Curriculum for Early Education – 2019”. This teaching method contributes to the development of language and the promotion of complex and educational communication. Also, Baciu, Bocoş & Verdeş (2022b) point out that storytelling stimulates the development of language and communication in preschool children, contributing to their coherent and expressive expression.

Şargu (2024) highlights the importance of stories in educating children's moral traits, giving them the opportunity to distinguish between good and bad, beautiful and ugly, through their characters and actions. Cerghit (2006) points out that an engaging and engaging story can stimulate intense emotional participation in children, thus facilitating the understanding and assimilation of moral messages.

Baciu, Bocos & Verdeş (2022a) provide methodical requirements for effective storytelling, including careful selection of facts and use of simple and clear language. They also stress the importance of illustrating the content of the story to amplify the emotional and cognitive impact.

Through storytelling, children develop their language skills and imagination and have the opportunity to express their creativity and enrich their vocabulary. Baci, Bocoş & Verdeş (2022b) mention that storytelling can contribute to the formation of independent storytelling skills in pre-school children, thus strengthening their expressive abilities.

Stories made by educators and those created by children provide valuable opportunities for learning and personal development in the context of early learning. Through storytelling, children can express their views and perspectives on the world around them, contributing to their holistic formation and development.

III.2.4. Role play

Role-playing is essential in children's development, providing them with an engaging way to express their ideas and interact with others. According to Răileanu et al. (2022), play is the whole universe of children, being the way they communicate, build relationships and develop.

„Role-playing is a type of game or teaching game that represents the most important subcategory of simulation games.” (Bocos et al., 2021f, p. 975)

Stefan (2006) points out that role play develops language and encourages the free expression of children's feelings and thoughts. Răduţ-Taciu et al. (2021) stress the importance of emotional involvement in role play and the need for careful preparation to ensure its success.

Role play is beneficial in language development, providing children with excellent opportunities to express their ideas and interact with other children. They help to expand vocabulary and develop communication skills. Through role play, children learn essential social rules and develop empathy and social skills.

By participating in various roles and scenarios, children are exposed to new words and expressions, and by listening and responding to other players' contributions, they develop listening skills and understanding of spoken language. Role plays also involve non-verbal communication, helping to develop communication and concentration skills.

In conclusion, role-playing is essential in children's development, providing them with valuable opportunities for learning and personal development in a safe and free environment.

III.2.5. Simulation game

Simulation play, as described by Stefan (2006), is a key way in which children explore and imitate their real lives in a playful environment. Participating in simulation play helps preschoolers learn about the world around them, develop social skills and use their imagination.

„These games simulate real-life situations that are engaging for children. During the game pupils get acquainted with the specifics of adult activities, unusual places, occupations and professions.” (Bocos et al. 2021g, p. 980)

These activities contribute to the cultivation of fundamental cognitive skills such as logical thinking and problem solving. Simulation games also encourage cooperation and effective communication between children, developing essential social skills.

Through simulation games, children acquire practical knowledge and learn important social rules. These experiences contribute to the development of vocabulary and imagination, stimulating creativity and abstract thinking in pre-schoolers.

In conclusion, simulation games are essential in the development of pre-school children, providing them with valuable learning and development opportunities in a safe and stimulating environment. Through these games, children develop language, cognitive, social and emotional skills crucial for everyday life.

III.2.6. Speech therapy game

„The speech therapy game is a type of game or didactic game made up of a category of speech therapy exercises / pronunciation improvement and correction exercises, used for remedial and compensatory purposes, in a playful form.” (Bocos et al., 2021h, p. 993)

These playful activities are not only fun but also educational, helping children to improve their vocabulary, pronunciation and communication skills.

Through speech therapy games, children can develop their speech and communication skills in a relaxed and fun environment without the pressure of a traditional lesson. These activities provide excellent opportunities for exploring new words and learning their meaning in appropriate contexts.

Another benefit of speech therapy games is improving correct pronunciation. By repeating sounds or words during games, children train their articulatory muscles and improve their ability to articulate sounds correctly.

Speech therapy games also help develop listening and comprehension skills, promoting non-verbal communication and understanding the meaning of gestures and facial expressions.

In conclusion, speech and language games are an effective and fun way to develop language in pre-school children, preparing them for later school and social success. Through these activities, children can learn and develop in an enjoyable and stimulating way.

III.3. The role of embodied cognition education language education activities in the general development of young preschoolers

Language education activities based on embodied cognition are essential for the development of young preschoolers, according to Sargu (2024). These activities involve active engagement of the body in the learning process, emphasizing physical experience and interaction with the environment.

By manipulating objects, exploring space and interacting with other children or adults, children acquire new words and concepts in a real and meaningful context, thus contributing to the development of vocabulary and communication skills.

Embodied cognition language education involves logical thinking and problem-solving in a physical context, thus stimulating the development of cognitive skills.

These activities can also contribute to the development of pre-schoolers' motor skills, through manipulation of objects and games involving movement, developing coordination and fine and gross motor skills.

By actively involving children in the learning process, activities based on embodied cognition are more engaging and motivating, stimulating them to explore and learn in innovative and interactive ways.

In conclusion, embodied cognition language education activities are an effective and engaging way for young preschoolers to develop, building a solid foundation for their later development and encouraging them to explore and learn actively and deeply.

III.4. Limitations of the embodied cognition approach to early language education for young preschoolers

The embodied cognition approach to language education for preschool children has both significant advantages and important limitations. Implementing this approach requires additional resources and training for educators, and adapting teaching methods to the specific needs of each child can be difficult in a preschool setting. Assessment of language performance in this context can be subjective and difficult to standardise, which can lead to difficulties in reporting results to parents and school authorities.

Also, implementing an embodied cognition approach may require additional material resources and time for planning and implementation, which may affect educators' ability to cover other important aspects of preschool development. Although this approach is theoretically supported, there are still uncertainties about its effectiveness compared to other methods in early childhood language education. Careful assessment of needs and available resources is therefore essential before adopting this approach in a particular educational context.

PARTH B. PRESENTATION OF EXPERIMENTAL RESEARCH

CHAPTER IV

DESCRIPTION OF THE EXPERIMENTAL RESEARCH ENTITLED „INVESTIGATION OF THE FORMATIVE AND INFORMATIVE VALUE OF THE APPLICATION OF THE EDUCATIONAL PROGRAMME «INTEGRATED EXPLOITATION OF SENSORY-MOTOR STIMULI» WITH EMPHASIS ON THE USE OF EMBODIED COGNITION, IN THE LANGUAGE EDUCATION OF YOUNG PRESCHOOLERS”

The experimental research proposed and carried out by us was entitled „Investigating the formative and informative value of the application of the educational program «integrated exploitation of sensory-motor stimuli», with emphasis on the use of embodied cognition, in the language education of young preschoolers”. We focused on assessing how this approach influences children's learning and development, exploring how interaction with the physical environment and hands-on experiences can support language development. We chose to work with toddlers because this period is a critical time for educational interventions and the plasticity of the brain at this age allows for more effective adaptation to stimuli. The research results highlighted the importance of sensory-motor experiences in language development and provided valuable insights for preschool education and parents.

We employed a within-subjects research design using the single-group technique. The research was practical and applied, longitudinal in nature and involved an extensive number of participants.

The aim of this research was to study the effect of the application of the educational program „Integrated sensory-motor stimulus exploitation”, based on embodied cognition, on the language education approaches of preschool toddlers.

The research proposed the following objectives:

- To investigate the opinions of preschool teachers, respondents to the questionnaire, from the counties of Arad, Alba, Bihor, Caraş-Severin, Cluj, Gorj, Timişoara, Hunedoara, on the effect of embodied cognition on the language education of young preschoolers;
- To determine the difficulties encountered by young preschoolers in understanding the meaning of new words in kindergarten language education activities;

- Identifying difficulties young preschoolers have had in pronouncing certain words or groups of words correctly;
- Determining the linguistic behaviour of young preschoolers by applying an observation grid;
- Assessing young preschoolers' behaviors by applying the Educator-Preschooler Rating Scale (The instrument was developed by the researchers, based on the instruments of researchers Hightower and Perkins, 2010);
- Designing, implementing and testing the effectiveness of the educational program based on the structuring of activities in which the integrated exploitation of sensory-motor stimuli took place, with a focus on the use of embodied cognition in the language education of young preschoolers;
- Identifying weaknesses/vulnerabilities of the educational programme and applying strategies to improve it.

The research questions that guided our research were:

- Can embodied cognition, as exploited in the educational program „Integrated Exploitation of Sensory-Motor Stimuli”, influence the approach to language education of young preschoolers?

- What are the formative-educational and informative-didactic values of the application of the educational programme „Integrated use of sensory-motor stimuli”, with emphasis on the use of embodied cognition in the language teaching process in the early years?

The basic hypothesis was: **The application of the educational program „Integrated Exploitation of Sensory-Motor Stimuli” designed for language education of young preschoolers based on embodied cognition leads to optimized word comprehension and improved pronunciation quality.**

Starting from the basic hypothesis, the following secondary hypotheses were identified:

Hypothesis 1. Application of the educational program „Integrated sensory-motor stimulus exploitation” designed for language education of young preschoolers based on embodied cognition leads to optimization of word retention in receptive language of preschoolers.

Hypothesis 2. The application of the educational programme „Integrated sensory-motor stimulus exploitation” designed for early preschool language education based on embodied cognition leads to significant changes in the degree of correctness in sound production and

the degree of correctness in word pronunciation in preschoolers' expressive language.

The independent variable consisted of:

- The educational program „Integrated sensory-motor stimulus exploitation” designed for language education of young preschoolers based on embedded cognition;

Dependent variables

- **Degree of comprehension of words in language education approaches.**

It was operationalized using the following indicator:

- Degree of word retention in preschoolers' receptive language;
- **Quality of word pronunciation by young preschoolers.**

It was operationalised using the following indicators:

- degree of accuracy in producing sounds specific to preschoolers' expressive language;
- the degree of correctness in the pronunciation of words in the expressive language of preschoolers;

A mediator variable was identified:

- biological gender;

The research strategy included various elements such as the methods and instruments used in the research process, the sample of participants and content, the location and time period of the research, and the investigative actions taken.

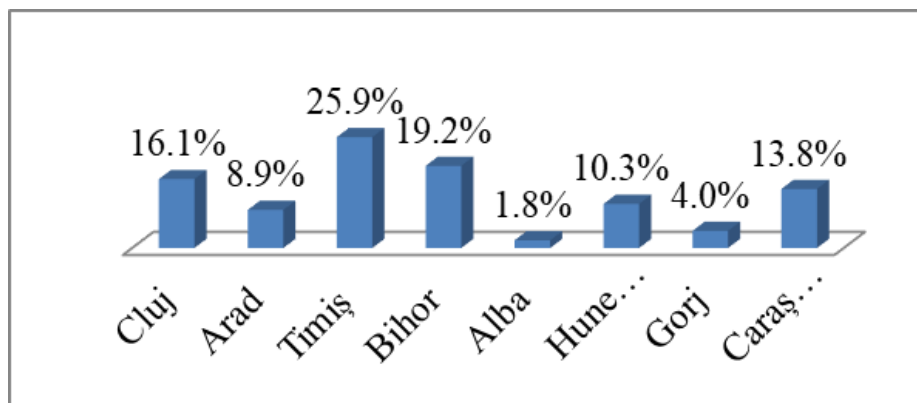
In this research, we used the following research **methods and tools**:

- **The method of psycho-pedagogical experiment** through the **educational program** „Integrated exploitation of sensory-motor stimuli”, focusing on the use of embodied cognition.
- **The survey method** with **the instrument called questionnaire**, addressed to preschool teachers on the effect of embodied cognition on the language education approaches of young preschoolers. The questionnaire was administered to a sample of 224 teachers from several counties, including Arad, Alba, Bihor, Caras-Severin, Cluj, Gorj, Timisoara and Hunedoara, and was applied only in the pre-experimental stage.
- **The observation method** was carried out in natural observation situations using the following **instruments**:
 - ✓ **The observation grid of preschoolers' linguistic behaviour**, developed by the author of the paper, with 24 items divided into five constructs: „Difficulties in

attention and compliance to instructions”, „Degree of comprehension and retention of words in preschoolers' receptive language through sensory-motor association”, „Use of nonverbal means and concrete materials in expressing and understanding words”, „Curiosity and involvement in the process of language education”, and „Degree of correctness in sound production and word pronunciation in preschoolers' expressive language”.

- ✓ **Teacher-Preschooler Rating Scale**, consisting of 32 items, developed by the researcher based on the tools of researchers Hightower and Perkins (2010), assessing „Task orientation”, „Understanding and correct use of verbal structural meanings”, „Phonetically, lexically and syntactically correct oral expression”, and „Relating to peers”. Both instruments were used in the pre-experimental and post-experimental stages and were applied to the pre-schoolers involved in the research.

The research sample **included 224 pre-school teachers from both urban and rural settings**. These teachers worked in various counties such as Arad, Alba, Bihor, Caraş-Severin, Cluj, Gorj, Timișoara and Hunedoara.

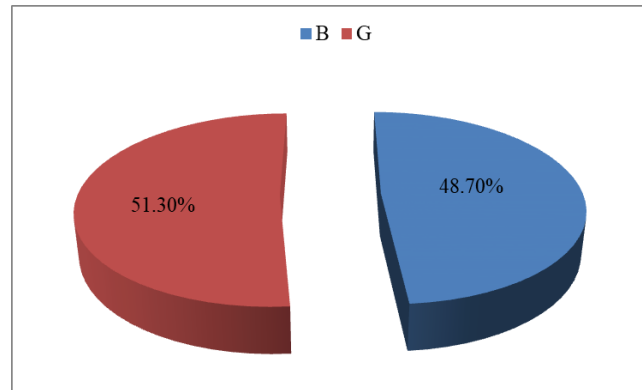


Source: own processing

Figure no. 1.IV. *Graphical representation of the distribution of the sample of participants by county*

According to Figure 1.IV, teachers from Timis county (25.9%) were the most open in completing the questionnaire, followed by teachers from Bihor (19.2%), Cluj (16.1%) and Caras-Severin (13.8%) counties. A small percentage of teachers from Alba (1.8%) and Gorj (4%) counties chose to join this research.

A total of 119 pre-school children aged between 3 and 4 years old were involved, from 3 state pre-school establishments, located in both urban and rural areas, all groups having extended hours. The preschoolers were selected by sampling at the preschool group level.



Source: own processing

Figure no. 9.IV. *Graphical representation of the distribution of pre-school children by gender*

According to Figure No. 9.IV. it was stated that in terms of gender the number of respondents was approximately equal, being completed by both girls (G) and boys (B).

The experiment included 20 learning situations, focusing on embodied cognition approach, to educate the language of young preschoolers. These situations were adapted to the developmental level of the preschoolers and were designed to develop understanding and correct pronunciation of sounds. In the pre-experimental stage, educators completed a grid to observe preschoolers' language behaviour, identifying unfamiliar words/expressions. These were grouped according to the sounds they contained and simple stories were created that included linguistic elements specific to each sound. Interactive activities based on the embodied cognition approach were designed in a playful and active way. During the programme meetings, educators read the stories and preschoolers participated in simulation games to understand the meaning of the words. Then, activities were organised for the correct pronunciation of sounds, involving the preschoolers' neural and bodily systems. The activities followed clear cognitive objectives and used carefully selected teaching materials in a playful and interactive learning environment.

The results of the preschoolers' participation in the educational programme were analysed in the pre-experimental and post-experimental stages to assess its effect on language education approaches in preschool children.

CHAPTER V

PRE-EXPERIMENTAL STAGE

The objectives of the pre-experimental stage included: defining and delimiting the content sample, signing partnership agreements between the directors of the educational units involved in the research and the Faculty of Psychology and Educational Sciences, Babeş-Bolyai University of Cluj-Napoca, setting up the experimental sample; application, analysis and interpretation of the questionnaire addressed to pre-school teachers on the effect of embodied cognition on the language education approaches of young pre-schoolers, analysis and interpretation of initial data on the observation grid of pre-schoolers' language behaviour, receiving agreement for the use of the Teacher-Child 2 Rating Scale. 1 (TEACHER-CHILD RATING SCALE (T-CRS)2.1), analysis and interpretation of initial data on the Teacher-Preschooler Rating Scale (The instrument was developed by the researchers based on the instruments of researchers Hightower and Perkins, 2010), and measurement and analysis of research participants' performance using the instruments specified above to obtain relevant and valid data to meet the proposed objectives.

Analyses of the questionnaire were conducted using IBM SPSS 20.0 statistical software at a 95% confidence level, including analyses of percentage distributions, absolute frequencies, and cross-tabulations (Chi-square).

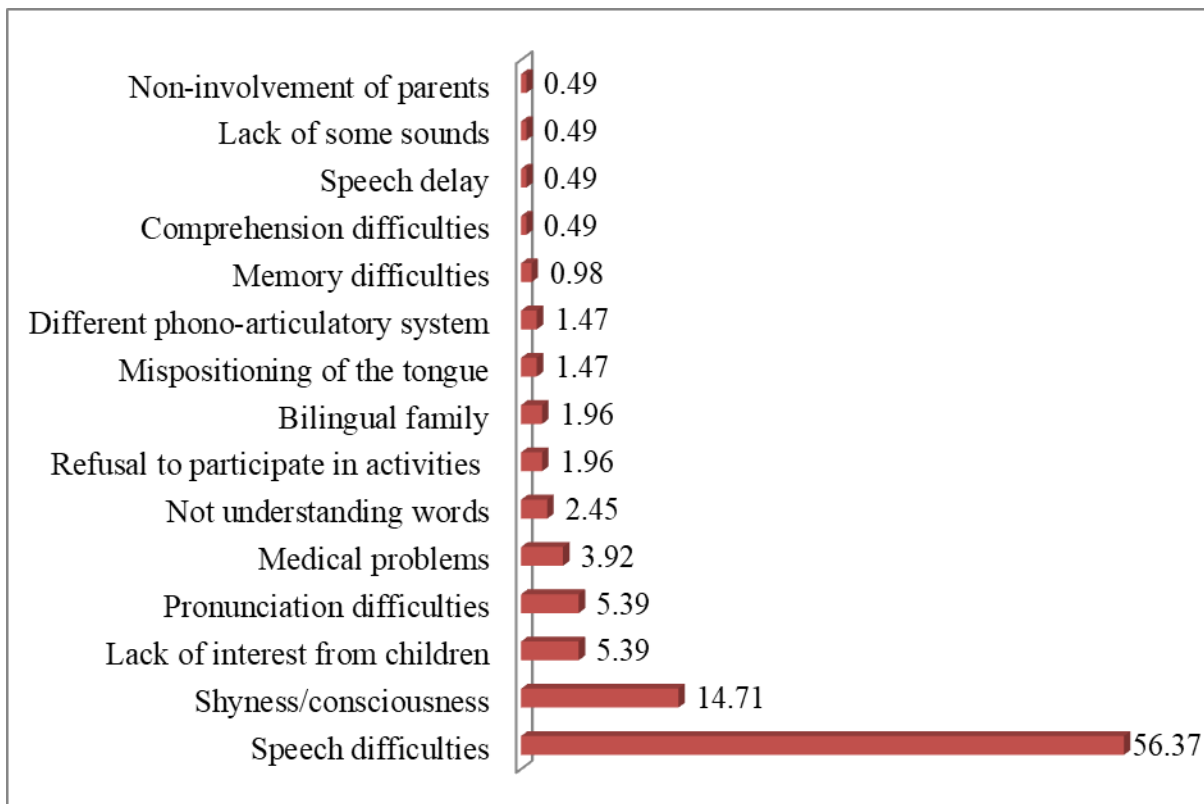
Table no. 5.V. *Difficulties encountered by pre-school children in understanding the meaning of new words*

Top	Difficulties	Percent
1	Difficulties understanding the meaning of new words	36.50
2	Pronunciation difficulties	15.70
3	Lack of image association	13.00
4	Reduced linguistic baggage	12.20
5	Communication difficulties	3.90
6	Lack of parental involvement in education	3.50

7	Teachers' way of explaining	3.50
8	Phonetic differentiation	3.00
9	Lack of children's interest	2.20
10	Lack of imagination	1.70
11	Poor social interaction	1.30
12	Lack of exercise	1.30
13	Different ethnicity	1.30
14	Poor memorization	0.40
15	Short-term learning difficulties	0.40

Source: own processing

When asked about the difficulties preschoolers have in understanding the meaning of new words, the most common were the ability to understand the meaning of a word (36.50%), pronunciation difficulties (15.70%), lack of association between the word and a corresponding picture (13.00%), and low linguistic background (12.20%) through knowing and recognising a limited number of words.



Source: own processing

Figure no. 6.V. *Graphical representation of difficulties encountered by pre-school children in pronouncing new words*

Although not mentioned as much by teachers, issues that had a negative impact on pronunciation difficulties among preschoolers were important to consider. Medical problems (3.92%), not understanding words (2.45%), refusal to participate in activities (1.96%), bilingual family where two different languages are spoken (1.96%), wrong positioning of language and different phono-articulatory system for some words (1.47%), poor memorization (0.98%), comprehension difficulties, speech delay, missing sounds and parental non-involvement (0.49%) were the ones that made it difficult to pronounce new words, whether they were simple or more complex words.

The results of the study showed that the majority of educators (83.48%) were familiar with the concept of embodied cognition and were able to provide a simple or complex definition of it. In both traditional and embedded cognition approaches, it was observed that developing creativity, thinking and imagination during language education activities was a strength. In contrast, weaknesses included the lack of an appropriate functional structure for the effective conduct of the educational process, as well as preschoolers' difficulties in understanding and pronouncing words correctly, along with shyness and embarrassment.

The most popular and widely used language teaching methods were stories, didactic play and reading. In order to apply the concept of embodied cognition in all groups, the educators suggested providing interactive materials, supporting freedom of movement and expression, targeting children's needs, and providing opportunities for teacher training in this technique. Thus, the language education system for preschoolers using embedded cognition can be successfully integrated into the current education system for the benefit of children.

Further, the study focused on assessing the degree of word comprehension in language education approaches and for improving the quality of pronunciation using the self-designed tool, the preschooler's language behavior observation grid.

The way of collecting the responses from the observation grid was done using Likert scales, so it was necessary to determine the validity of the research instrument. Following the application of the test to measure validity, the Cronbach's Alpha coefficient was obtained, which determines the consistency and reliability of the research instrument. The value of the coefficient was 0.906, much higher than the value of 0.7 (<https://www.statisticshowto.com/probability-and->

statistics/statistics-definitions/cronbachs-alpha-spss/), so the analysis continued with the study of the items that could be eliminated to increase the value of the coefficient. The analyses obtained confirmed that all 24 items characteristic of the research instrument were included in the following tests.

In order to determine how the items were grouped and the constructs formed, Principal Component Analysis (PCA) was applied, which had the main purpose of reducing the number of variables and organizing them into constructs.

Table no. 15.V. *Total variance of the survey instrument*

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.956	37.315	37.315	8.956	37.315	37.315	8.697	36.236	36.236
2	6.854	28.557	65.873	6.854	28.557	65.873	4.690	19.541	55.778
3	1.306	5.441	71.314	1.306	5.441	71.314	2.375	9.894	65.672
4	1.198	4.993	76.307	1.198	4.993	76.307	2.260	9.417	75.088
5	1.098	4.576	80.883	1.098	4.576	80.883	1.391	5.794	80.883
6	.773	3.221	84.104						
7	.589	2.452	86.557						
8	.513	2.138	88.694						
9	.350	1.458	90.152						
10	.322	1.343	91.496						
11	.263	1.097	92.592						
12	.249	1.039	93.631						
13	.233	.971	94.603						
14	.209	.870	95.473						
15	.202	.842	96.314						
16	.182	.759	97.073						
17	.129	.539	97.612						
18	.116	.484	98.096						
19	.109	.456	98.552						
20	.097	.403	98.955						
21	.078	.325	99.280						
22	.074	.309	99.588						
23	.060	.251	99.839						
24	.039	.161	100.000						

Extraction Method: Principal Component Analysis.

Source: own processing

Initially, Eigenvalues provided information on the number of constructs formed, so we had five constructs for which the value of this test was greater than 1.

The highest value of the variable was taken into account for the formation of the constructs, resulting in the following clustering mode:

Construct 1: Difficulties with attention and compliance with instructions in language education approaches

V5- Distracting group mates during activities.

V6- Does not pay attention when work tasks are being drawn up, showing difficulties in carrying them out.

V7- Does not like to learn new things.

V8- Cannot follow instructions, except with encouragement.

V13- Does not carry out simple actions in response to what the teacher tells him/her.

V14- Verbally aggressive with children when playing.

V15- Often does not understand the text of a story, needing to use retellings, dramatizations or drawing.

V16- In dialogic speech he does not expect his role.

V21- Cannot name the initial and final sounds in a word.

V22- In appropriate contexts does not use new words due to poor pronunciation.

V23- In oral communication, shows no interest in correct pronunciation of words.

V24- When unable to pronounce certain linguistic labels of words correctly, makes use of physical manipulation of the objects they designate.

Construct 2: Degree of comprehension and word retention in preschoolers' receptive language through sensory-motor association

V3- Show fair play, respecting the rules of the game group.

V4- Initiates different games and activities involving more than one child.

V10- Often uses a picture as a reference to understand the meaning of a word.

V11- In order to understand linguistic content, involves the motor and perceptual system as well as bodily interactions with the environment.

V12- Has the ability to understand messages conveyed through reading, storytelling or audio-visual means.

Construct 3: Use of nonverbal means and concrete materials in expressing and understanding words

V18- Use nonverbal behaviour (gestures) during a discussion.

V19- For correct expression of words with new concrete meanings, uses the relation to perceptible objects.

V20- For correct expression of abstract words, uses manipulable objects through perceptual actions.

Construct 4: Curiosity and involvement in the language education process

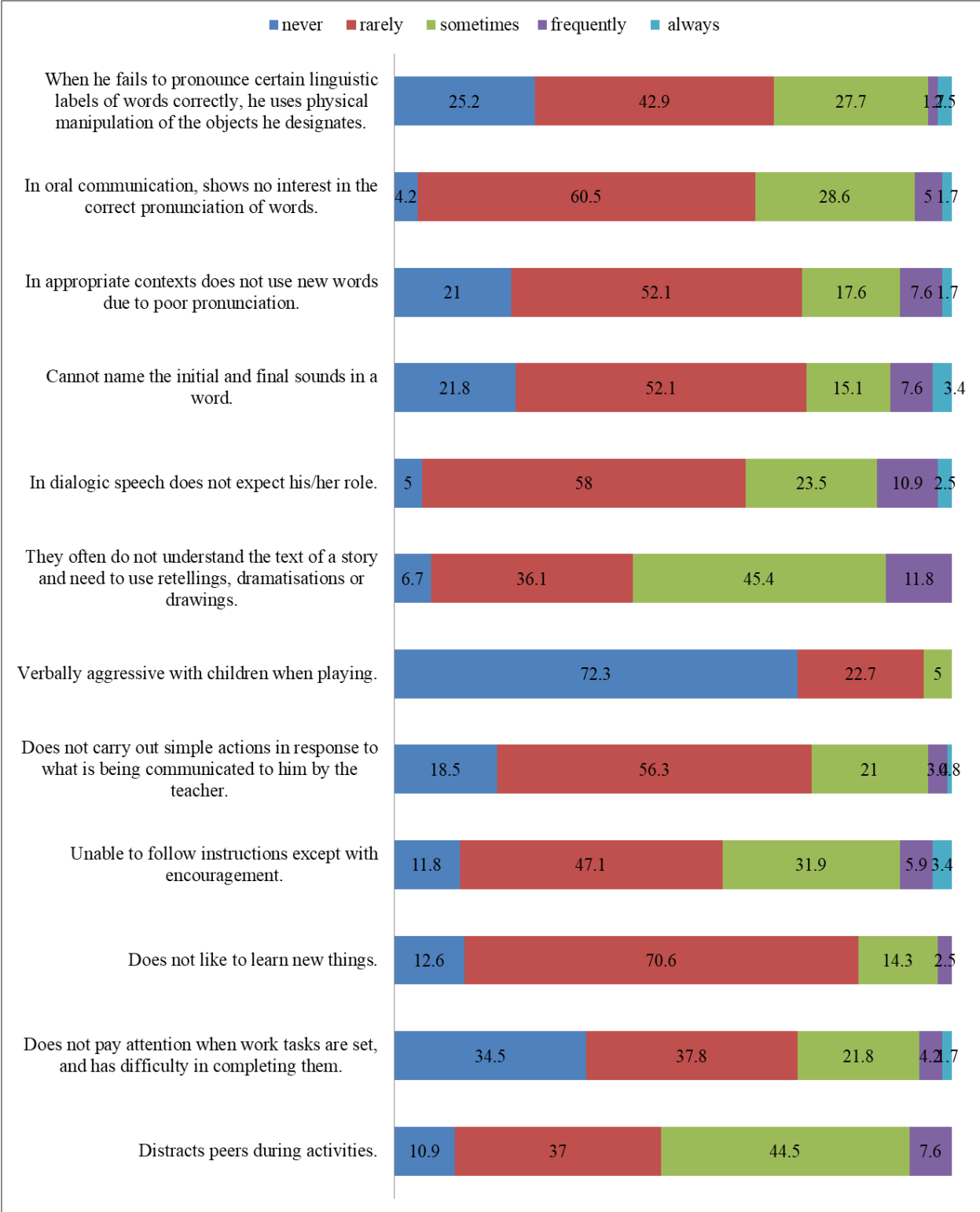
V1- Asks questions to find out more information, being curious.

V2- Performs work tasks with ease, completing them successfully.

V9- Takes part in group discussions.

Construct 5: Degree of correctness in sound production and word pronunciation in preschoolers' expressive language

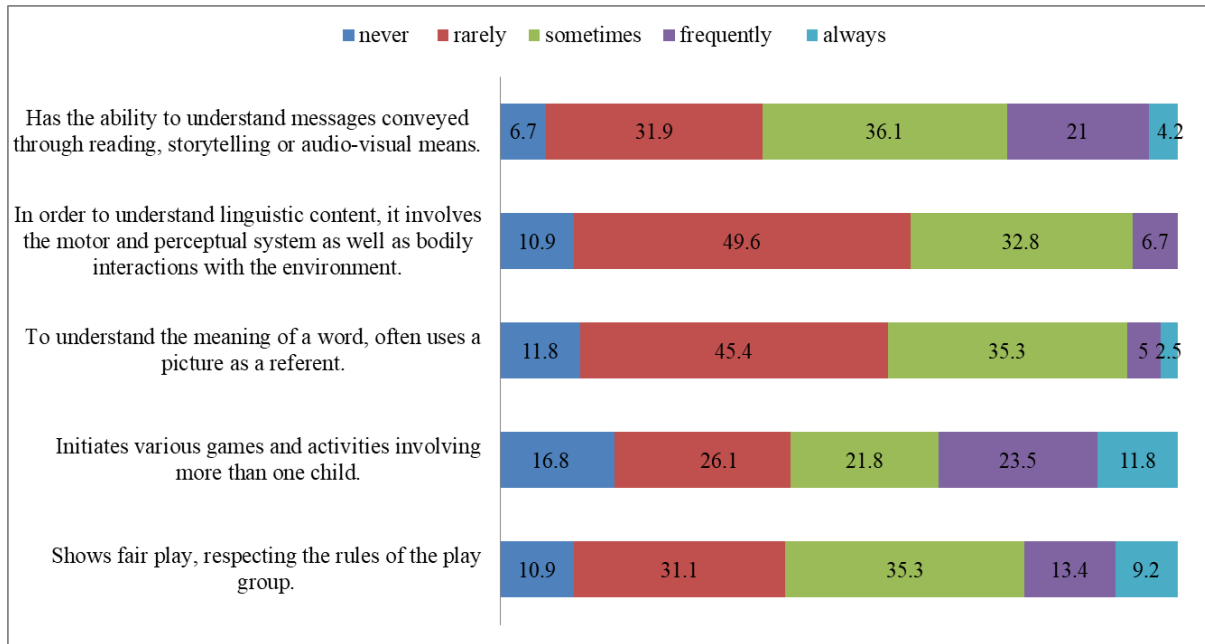
V17- Pronounces most of the sounds of the Romanian language correctly without the use of retellings, dramatization or drawing (42.8%).



Source: own processing

Figure no. 13.V. *Graphical representation of attention and compliance difficulties with instructions received in language education approaches*

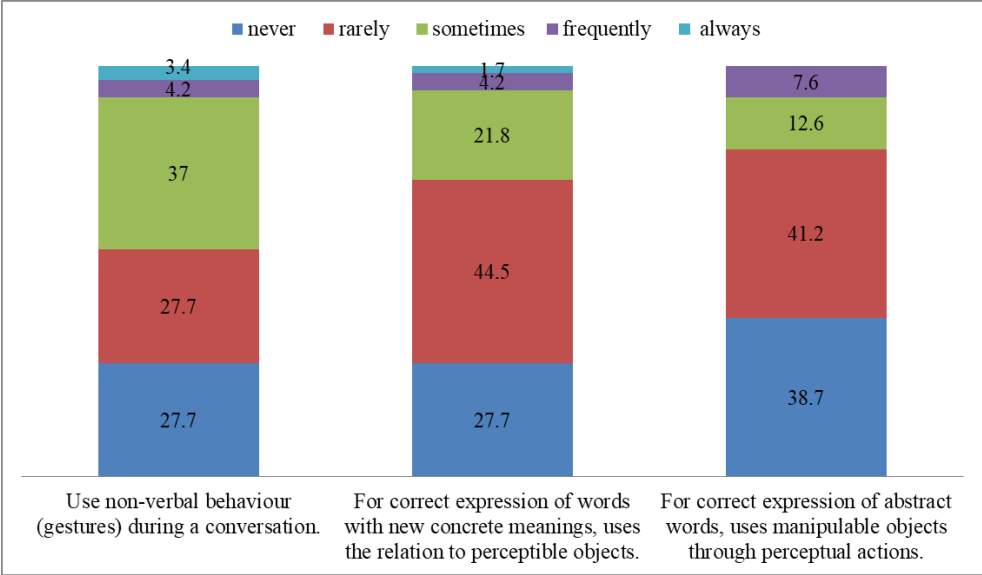
The greatest attention and compliance difficulties were characterized by a higher frequency of interrupting dialogue due to role unexpectedness (13.4%), not understanding the text of a story and having to use retellings, dramatizations or drawing (11.8%), not being able to name the initial and final sounds in a word (11%) and not using new words due to poor pronunciation (9.3%).



Source: own processing

Figure no. 14.V. *Graphical representation of comprehension and word retention in preschoolers' receptive language through sensory-motor association*

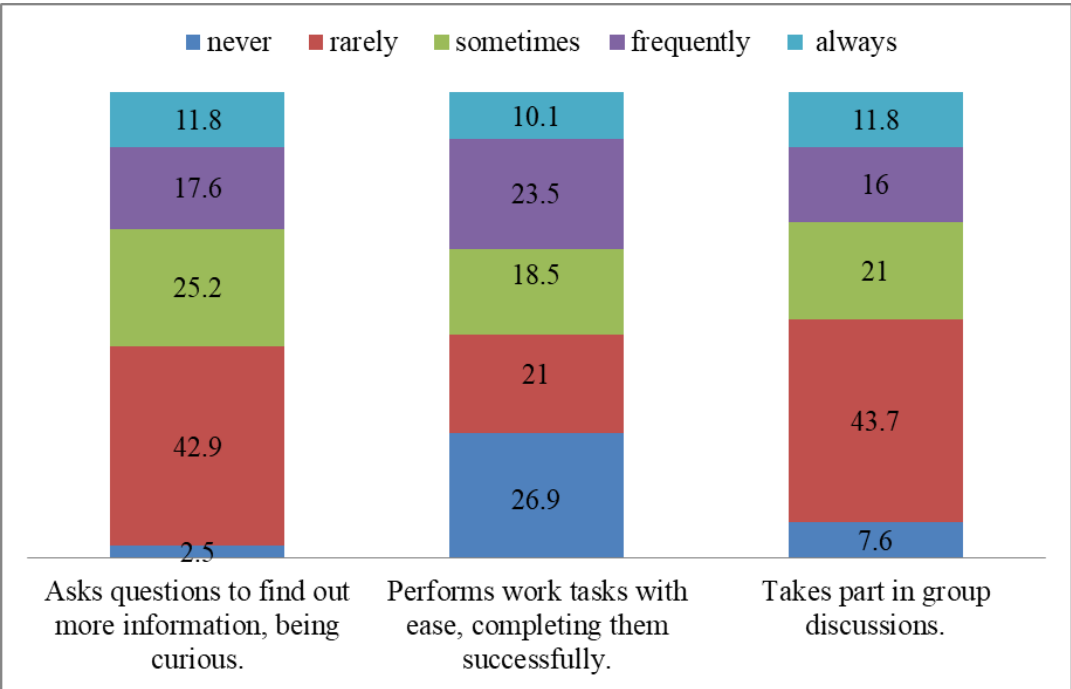
Some of the preschoolers had a high degree of comprehension and word retention, characterized by engaging in various games and activities involving more than one child (35.3%), being able to understand messages conveyed through reading, storytelling or audio-visual means (25.2%), and showing fair play by respecting the rules of the playgroup (22.6%).



Source: own processing

Figure no. 15.V. *Graphic representation of the use of nonverbal means and concrete materials in expressing and understanding words*

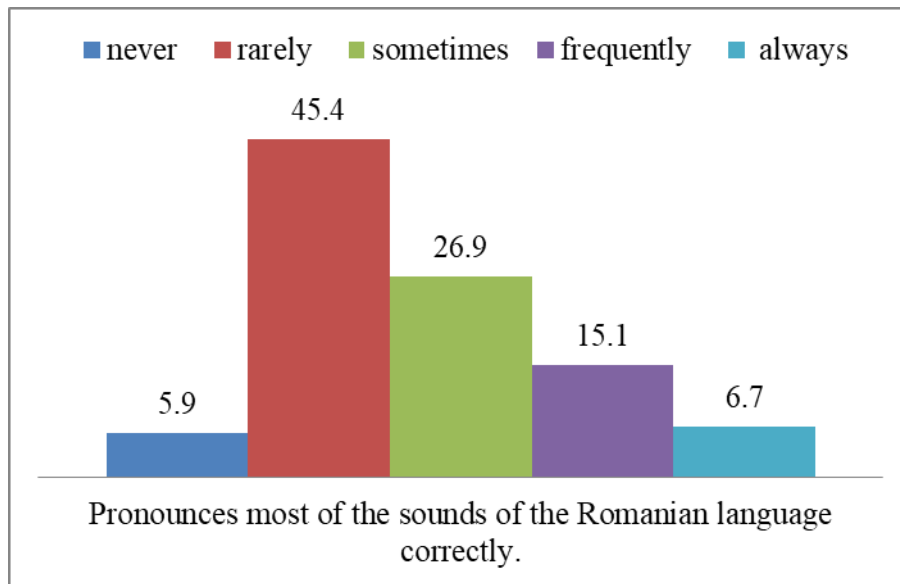
A small number of preschoolers used manipulable objects through perceptual actions to correctly express abstract words (7.6%), used nonverbal behaviours (gestures) during a discussion (7.6%), or used the relationship with perceptible objects to correctly express words with new meanings (5.9%).



Source: own processing

Figure no. 16.V. *Curiosity and involvement in the language education process*

There were, however, a proportion of young preschoolers in the sample who performed the tasks with ease, completing them successfully (33.6%), asking questions to probe further, being curious (29.4%), and taking part in group discussions (27.8%).



Source: own processing

Figure no. 17.V. *Graphical representation of sensory-motor association in the development of communication skills*

Only 21.8% of the 119 preschoolers observed always pronounced most of the Romanian sounds correctly.

Of the 119 preschoolers, half girls and half boys, it was observed that „Difficulties in attention and compliance to instructions” were lower compared to „Degree of comprehension and retention of words through sensory-motor association”, „Curiosity and involvement in the language education process”, and „Degree of correctness in word pronunciation”. Words and expressions specific to different areas of activity, mathematical terms and multiple meanings were more difficult for preschoolers to understand. Attention deficit, lack of parent-child communication, lack of visual explanations, young age and lack of life experience, and a still underdeveloped vocabulary negatively influenced the understanding of new words. Poor pronunciation of new words was attributed to pronunciation deficiencies, lack of correction and stimulation from adults for entertainment purposes, and poor role models. Pre-experimental

research revealed a negative association between „Difficulties in attention and compliance” and „Degree of comprehension and retention of words”, „Use of nonverbal means”, curiosity and involvement in the language education process, and correctness of pronunciation, suggesting that high levels of these difficulties had a negative impact on the other variables.

Also to assess the degree of comprehension of words in language education approaches and to improve the quality of word pronunciation by young preschoolers, the Educator-Preschooler Rating Scale (an instrument developed by the researchers, based on the instruments of researchers Hightower and Perkins, 2010) was used.

The Teacher-Preschooler Rating Scale is based on a research instrument that has been applied before (Teacher-Pupil Rating Scale T.CRS 2.1), but in this paper it has been adapted and improved to capture as accurately as possible aspects of word comprehension, i.e. word retention, and aspects of word pronunciation quality, i.e. correctness of sound production and word pronunciation.

The test was applied to measure validity and Cronbach's Alpha coefficient was obtained, which determined the consistency and reliability of the research instrument. The coefficient value was 0.871, much higher than the value allowed by the literature (0.7), 32 items (<https://www.statisticshowto.com/probability-and-statistics/statistics-definitions/cronbachs-alpha-spss/>), so the analysis continued with the study of the items that could be eliminated to increase the coefficient value.

Table no. 28.V. *Total statistics on rating scale validation*

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
v1	76.7563	200.457	.862	.854
v2	76.8151	207.440	.742	.858
v3	76.7815	199.342	.871	.853
v4	76.8067	197.835	.851	.853
v5	77.5462	236.623	-.182	.878
v6	78.0420	243.922	-.484	.882
v7	77.8235	233.418	-.064	.875
v8	77.9244	229.884	.067	.873
v9	76.5714	206.077	.740	.858
v10	76.7143	201.308	.828	.855
v11	76.8067	199.022	.857	.853
v12	76.8151	199.033	.841	.854
v13	78.2857	243.138	-.473	.881
v14	78.4454	243.995	-.590	.881

v15	78.4034	242.972	-.520	.880
v16	78.3782	245.763	-.548	.883
v17	76.6134	202.934	.828	.855
v18	77.0672	206.250	.785	.857
v19	77.2017	201.959	.794	.855
v20	77.1933	201.513	.832	.855
v21	77.2689	211.775	.541	.863
v22	77.2941	209.379	.543	.863
v23	77.9328	223.521	.367	.868
v24	77.7395	227.228	.183	.871
v25	76.6218	207.780	.702	.859
v26	76.4454	209.927	.684	.860
v27	76.5294	207.794	.687	.859
v28	76.5798	205.364	.664	.859
v29	78.0252	241.364	-.359	.881
v30	78.3193	244.270	-.504	.882
v31	78.3866	240.629	-.353	.880
v32	78.4790	239.133	-.327	.878

Source: own processing

In the „Cronbach's Alpha if Item Deleted” column, items with Cronbach's Alpha values less than 0.2 or negative were deleted.

The analyses obtained confirmed that all 32 items characteristic of the research instrument will be included in future tests.

Based on the Teacher-Student Rating Scale (T-CRS 2.1) developed by the Children's Institute, the author proposed the formation of four constructs called „Task orientation”, „Understanding and correct use of verbal structural meanings”, „Phonetically, lexically and syntactically correct oral expression” and „Relating to peers”. Each construct was composed of eight items, four positive and four negative. In order to calculate the total score both for each of the two dimensions (positive and negative) and for the overall total construct score, the mathematical operation of summing the scores of each item was applied.

- **Workload orientation**

a. Positive orientation

- Show initiative and take part in discussions during activities.
- Works well, even when distracted.
- Works well without adult support.
- Completes work tasks.

b. Negative orientation

- Has difficulty in following the work tasks set.
- Performs poorly in language development activities.
- Is poorly motivated to achieve.
- Shows poor concentration and gets bored quickly.
- **Understanding and correct use of verbal structural meanings**
 - a. Understanding and positive use**
 - Ask and answer simple questions.
 - Can convey a coherent message in learning activities.
 - Performs simple actions in appropriate response (verbal or behavioural) to what is said.
 - Follows a story line in conjunction with the pictures in the book.
 - b. Understanding and using negatives**
 - It disturbs others while delivering a simple message in play or learning activities.
 - Is verbally aggressive with peers when playing.
 - Is defiant, stubborn and disobedient in the use of conversational speech.
 - Is boisterous during story time.

Phonetically, lexically and syntactically correct oral expression

a. Positive expression

- Pronounces the sounds of the Romanian language (relatively) correctly.
 - Understands the meaning of a word in different learning situations.
 - Uses new words in appropriate contexts.
 - Shows initiative in oral communication and interest in the meaning of words.
- #### ***b. Negative expression***
- She is an introvert when she recites poems with respect for intonation, rhythm and pause.
 - He is anxious and worried when he does not pronounce the sounds of the Romanian language (relatively) correctly.
 - Is frightened and nervous when he does not recognise the initial sound of a word.
 - Does not form simple sentences about familiar objects and people.

Dealing with colleagues

a. Positive relationship

- Makes friends easily, showing initiative in oral communication.

- Peers like to sit next to him when a story is read.
- Has many friends in whose company he enjoys educational activities in the group room.
- He is loved by his classmates.

b. Negative relationship

- Does not perform tasks in group activities.
- In teamwork, children avoid it.
- In discussions and interactions with peers, shows difficulties.
- The other children do not like his company in games and educational activities.

Table no. 30.V. *Distribution of positive and negative workload orientation*

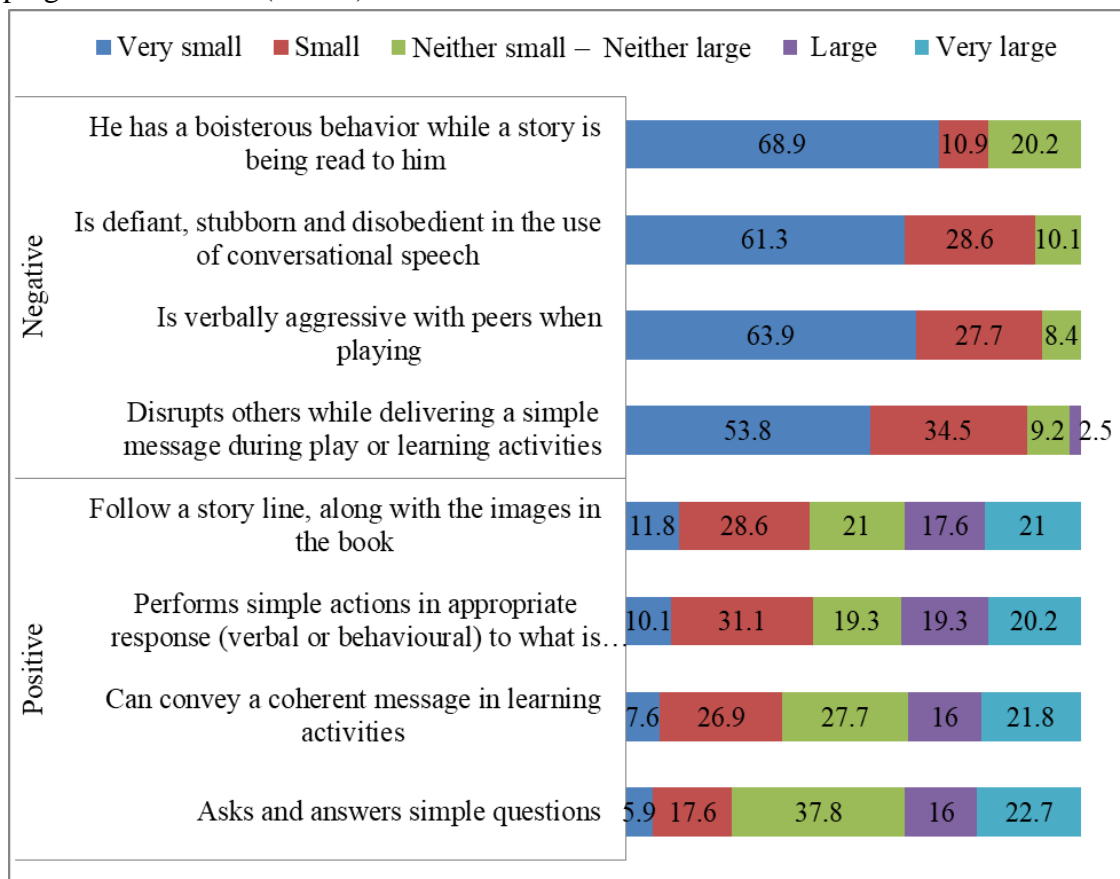
Orientation		Very small	Small	Neither small - Neither large	Big	Very big
Positive	Show initiative and take part in discussions during activities	6.7	30.3	26.9	15.1	21
	Works well, even when distracted	9.2	21	31.9	28.6	9.2
	Works well without adult support	7.6	32.8	21.8	16.8	21
	Completes work tasks	13.4	26.9	19.3	18.5	21.8
Negative	Has difficulty following through on work tasks	21.0	29.4	43.7	5.9	
	Performs poorly in language development activities	37.8	42.0	17.6	2.5	
	Is poorly motivated to achieve	29.4	36.1	32.8	1.7	
	Shows poor concentration and gets bored quickly	37.8	31.1	27.7	3.4	

Source: own processing

In terms of preschoolers' „Work Task Orientation,” the items that scored highest (sum of „high” and „very high” scale scores) referred to successfully completing work tasks (40.3%), working productively even when distracted (37.8%), and being able to work without adult support (37.8%), as well as showing initiative and participating in discussions during activities (36.1%).

Most of the preschoolers (sum of „low” and „very low” scale scores) performed well in language development activities (79.8%), showed a high ability to concentrate without getting bored

(68.9%), felt a high level of motivation in achieving the goal (65.5%) and had no difficulties in mapping out work tasks (50.4%).



Source: own processing

Figur. 25.V. Graphic representation of the distribution of understanding and correct use of positive and negative verbal structural meanings e no

Figure no. 25.V clearly shows the distribution of the responses given, so that the positive aspects of the construct „Understanding and correct use of verbal structural meanings” (sum of „low” and „very low” scale scores) with a lower occurrence referred to the performance of simple actions as an appropriate response (verbal or behavioural) to what they were told (41.2%), following the line of a story along with the pictures in the book (40.4%), conveying a coherent message in learning activities (34.5%) and asking and answering simple questions (23.5%).

There was also an extremely low percentage (2.5%) of preschoolers who disturbed peers while delivering a simple message in play or learning activities, with the presence of this aspect occurring occasionally and punctually.

Table no. 35.V. *Descriptive analyses of phonetically, lexically and syntactically correct oral expression*

Expression	Media	Standard deviation	Minim	Maxim	Amount
Positive	11.49	4.55	4.00	20.00	1367.00
Negative	9.33	3.19	4.00	16.00	1110.00

Source: own processing

The positive aspects of „Phonetically, lexically and syntactically correct oral expression” recorded an average score of 11.49 points, ranging from a minimum of 4 points to a maximum of 20 points. The deviation from the average plus or minus was 4.55 points.

The negative aspects of „Phonetically, lexically and syntactically correct oral expression” had an average score of 9.33 points, between a minimum of 4 points and a maximum of 16 points. The deviation from the average was plus or minus 3.19 points.

Following the analysis of the results, it was concluded that the new research instrument, called the Educator-Preschooler Rating Scale, was validated both as a whole and for each individual construct. „Phonetically, lexically and syntactically correct oral expression” and „Task orientation” revealed the difficulties encountered by the preschoolers in the group activities. On the other hand, 'Understanding and correct use of verbal structural meanings' and 'Relating to peers' positively illustrated the preschoolers' understanding and social interaction skills.

CHAPTER VI

EXPERIMENTAL STAGE

Chapter VI describes the experimental phase of the study focusing on word comprehension in language education approaches and on improving the quality of pronunciation by young preschoolers through the educational program „Integrated Exploitation of Sensory-Motor Stimuli” with emphasis on embodied cognition.

The objectives of the experimental phase, which formed the basis of our proposed educational program, were:

- to develop an educational intervention program, which included language education for young preschoolers, based on the training in activities of the motor system, the perceptual system, as well as on bodily interactions with the environment;
- designing a system of activities to educate the language of young preschoolers, focusing on the use of embodied cognition;
- design, implementation and coordination of a system of language education activities aimed at developing word comprehension;
- design, implementation and coordination of a system of language education activities aimed at improving the quality of word pronunciation.

This stage is a fundamental aspect of the research, as it provides information about how effective the program is and how it assesses word comprehension and improves the quality of word pronunciation in the language education process for the young preschoolers involved in the study.

The preschool education program included 20 activities, 10 for word comprehension and 10 for pronunciation, carried out systematically over four months, February-May 2023. The focus was on language development through an embedded cognition approach, actively involving children in learning. The activities were organised in a safe and stimulating environment, taking place on Tuesdays and Thursdays. They included readings, interactive games and practical exercises, tailored to support the development of language and cognitive skills in pre-schoolers. The programme offered an innovative and interactive approach to language development, integrating practice and theory in a stimulating setting.

During the experiment, the teachers implemented the activities of the proposed programme under the guidance of the researcher. There was close collaboration between the researcher and

the teachers, facilitating a two-way exchange of information. The planning of activities was done systematically, taking into account feedback and suggestions from teachers. The uniqueness of the programme lay in the innovative approach that engaged children physically, cognitively and emotionally, using the proximal environment effectively. By stimulating creativity, imagination and curiosity, an attempt was made to instil the importance of language education activities.

The process of implementing the education programme involved several key steps:

- **Planning and organisation:** - Educators were trained and prepared for the implementation of the programme, establishing objectives, contents and evaluation methods;
- **Coordination and collaboration:** - The researcher and the educators worked closely together to ensure the correct implementation of the programme, adapted to the needs of each group of preschoolers.
- **Facilitation of the learning environment:** - Suitable conditions were created in the group room and the necessary teaching materials were prepared.
- **Instruction and guidance of pre-schoolers:** - The teachers guided the pre-schoolers in the activities using interactive methods and educational games.
- **Evaluation and adjustment:** - Regular evaluations were carried out to monitor progress and identify necessary adjustments in planning.
- **Reporting results:** - Results were recorded, analysed and reported to assess the effectiveness of the programme to stakeholders.

Table no. 14.IV. *Title of language education activities based on the embodied cognition approach and proposed timeframe for implementation*

Name of activities for early language education for preschoolers based on the embodied cognition approach	Week Tuesday and Thursday
<ul style="list-style-type: none"> • - <i>Activities to develop comprehension of „P” words</i> Activity no. 1: „Discovering the P Sound” Story – „Paco the Parrot and Pandel the Piglet”	Week 1
<ul style="list-style-type: none"> • - <i>Activities to improve the pronunciation quality of the „P” sound</i> Activity no. 1: „Discovering the P Sound” The speech therapy game – „Fishing”	
<ul style="list-style-type: none"> • - <i>Activities to develop comprehension of words containing the „R” sound</i> Activity no. 2: „Exploring R Sound” Story – „Rareş and his Girlfriend”	Week 2
<ul style="list-style-type: none"> • - <i>Activities to improve the quality of pronunciation of the „R” sound</i> 	

Activity no. 2: „Exploring R Sound”
The speech therapy game – „Train”

- *Activities to improve the quality of pronunciation of the „R” sound*

Activity no. 3: „Searching for Sound M”
Story – „Big Snow”

Week 3

- *- Activities to improve the pronunciation quality of the „M” sound*

Activity no. 3: „Searching for Sound M”
Speech therapy game – „The Little Playful Hand”

- *- Activities to develop comprehension of „F” words*

Activity no. 4: „The Story of Sound F”
Story – „The Silly Boy”

Week 4

- *- Activities to improve the pronunciation quality of the „F” sound*

Activity no. 4: „The Story of Sound F”
Speech therapy game – „Pufi Bunny”

- *- Activities to develop comprehension of words containing the „S” sound*

Activity no. 5: „The Adventure of Sound S”
Story – „Nicusor”

Week 5

- *- Activities to improve the quality of pronunciation of the „S” sound*

Activity no. 5: „The Adventure of Sound S”
Speech therapy game – „Thimble Sasha”

- *- Activities to develop comprehension of words containing the „J” sound*

Activitatea nr. 6: „Jocul cu sunete J”
Poveste – „La bunica și la bunicul”

Week 6

- *- Activities to improve the pronunciation quality of the „J” sound*

Activity no. 6: „The Sound Game J”
The Speech Game – „The Storm”

- *- Activities to develop comprehension of „C” words*

Activity 7: „Exploring Sound C”
Story – „Santa's Cock-a-doodle-doo”

Week 7

- *- Activities to improve the pronunciation quality of the „C” sound*

Activity 7: „Exploring Sound C”
Speech and language game – „What sounds do birds make?”

- *- Activities to develop comprehension of words containing the „H” sound*

Activity no. 8: „Searching for Sound H”
Story – „Sheep in habitat”

Week 8

- *- Activities to improve the pronunciation quality of the „H” sound*

Activity no. 8: „Searching for Sound H”
Speech therapy game – „The Goose H-Hash-Hash”

- - *Activities to develop comprehension of words containing the „T” sound*

Activity no. 9: „The T Sound Story”
Story – „Timmy the Kitten”

Week 9

- - *Activities to improve the quality of pronunciation of the „T” sound*

Activity no. 9: „The T Sound Story”
Speech therapy game – „TIIT-TIIT machine”

- - *Activities to develop comprehension of words containing the „L” sound*

Activity no. 10: „Discovering the L Sound”
Story – „Lica the Cat”

Week 10

- - *Activities to improve the quality of pronunciation of the „L” sound*

Activity no. 10: „Discovering the L Sound”
Speech therapy game – „Beat the drum”

CHAPTER VII
POST-EXPERIMENTAL STAGE

In the post-experimental phase, the focus was on several clear objectives, which formed the basis of our research. These objectives included:

- Completion of the Preschool Language Behavior Observation Grid (Appendix #13), and the Educator-Preschooler Rating Scale (The instrument was developed by the researchers, based on the instruments of researchers Hightower and Perkins, 2010) (Appendix #15) for each participating preschooler; All of these instruments were also used in the pre-experimental phase;
- assessment, using the above-mentioned instruments, of participants' performance.

In the post-experimental phase, changes were made to the sample of participants, excluding pre-school teachers in the eight counties of the country. The phase took place in June 2023 and involved evaluating changes that occurred as a result of preschoolers' participation in our intervention program. This evaluation was conducted using the same research instruments as in the pre-experimental and experimental phase. The posttest procedure consisted of administering each research instrument individually to each preschooler.

As in the pre-experimental stage, data collected using the preschoolers' language behaviour observation grid were recorded in IBM SPSS Statistics 20 statistical analysis software. The results obtained were presented individually for each indicator measured. They were analysed in the post-experimental stage, after the educational programme had been applied, by filling in again the language behaviour observation grid used in the pre-experimental stage.

Table no. 1.VII. *Difficulties with attention and compliance with instructions received in language education approaches*

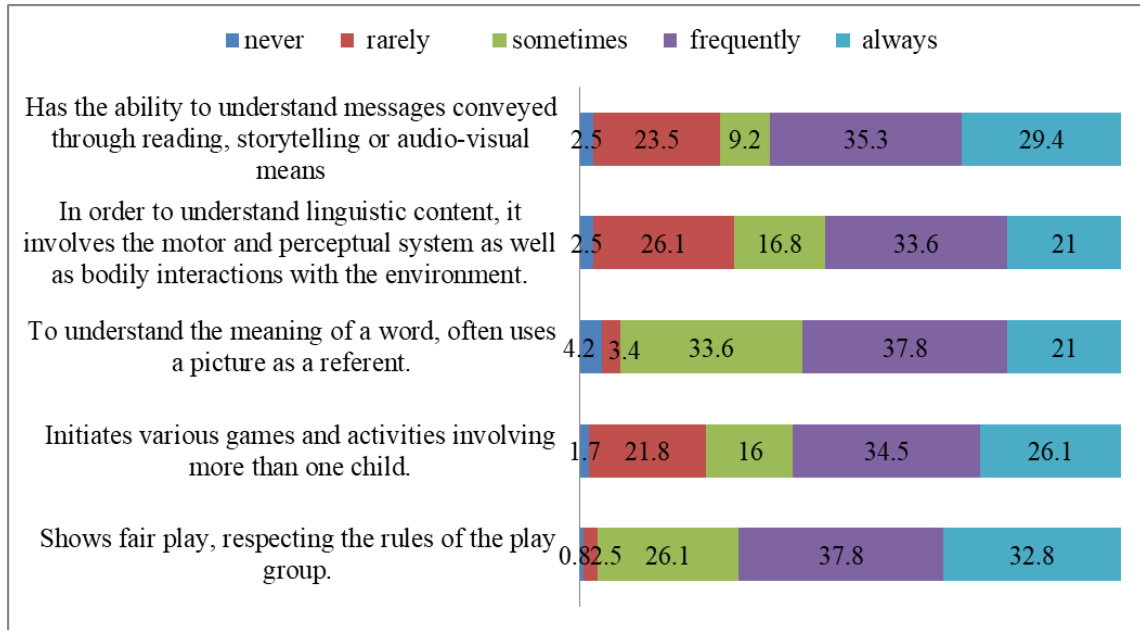
Difficulties	Never	Rare	Sometimes	Frequently	Always
Distracting group mates during activities.	37.0	42.0	7.6	3.4	10.1
Does not pay attention when work tasks are being set, making it difficult to complete them.	36.1	26.9	21.8	7.6	7.6
Does not like to learn new things.	58.8	25.2	3.4	2.5	10.1
Can't follow instructions unless encouraged.	29.4	25.2	22.7	13.4	9.2

Does not carry out simple actions in response to what the teacher tells him/her.	31.1	43.7	4.2	11.8	9.2
Verbally aggressive with children when playing.	57.1	29.4	.8	2.5	10.1
Often does not understand the text of a story, needing to use retellings, dramatisations or drawing.	19.3	27.7	33.6	15.1	4.2
In dialogic speech he does not expect his role.	23.5	33.6	24.4	9.2	9.2
Cannot name the initial and final sounds in a word.	48.7	29.4	5.0	5.9	10.9
Does not use new words in appropriate contexts due to poor pronunciation.	61.3	20.2	5.9	5.0	7.6
In oral communication, shows no interest in correct pronunciation of words.	37.8	26.9	21.0	6.7	7.6
When unable to pronounce certain linguistic labels of words correctly, uses physical manipulation of the objects they name.	35.3	15.1	31.1	5.9	12.6

Source: own processing

In the post-experimental stage, the majority of preschoolers showed a very high interest in learning new things (84%), without being verbally aggressive (86.6%) and using new words often enough in appropriate contexts (81.5%). They also showed respectful behaviour towards their peers in the group, without distracting them during activities (79%), were able to name the initial and final sounds in a word (78.2%), carried out simple actions in response to instructions from teachers (74.8%) and showed interest in the correct pronunciation of words (64.7%).

More than half of the preschoolers were attentive when tasks were explained to them and did not have difficulties in carrying them out (63%), waited for their turn to speak (57.1%), followed instructions without additional encouragement (54.6%), did not resort to physical manipulation of objects when they had difficulties with pronunciation (50.4%) and did not always understand the text of a story, requiring additional help in the form of retellings, dramatizations or drawings (47.1%).



Source: own processing

Figure no. 2.VII. *Graphical representation of comprehension and word retention in preschoolers' receptive language through sensory-motor association*

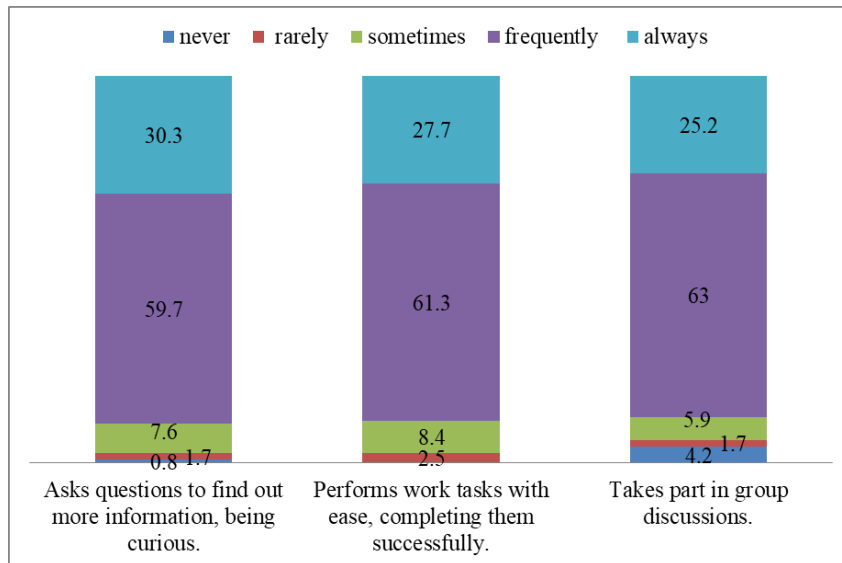
At the same time, more than a quarter of the observed preschoolers did not involve the motor, perceptual system or bodily interactions with the environment in understanding linguistic content (28.6%), did not have the ability to understand messages conveyed through reading, storytelling or audio-visual means (26%) and did not initiate games and activities involving more than one child (23.5%).

Table no. 3.VII. *Use of nonverbal means and concrete materials in expressing and understanding words*

Non-verbal means and concrete materials	Never	Rarely	Sometimes	Frequently	Always
Use non-verbal behaviour (gestures) during a conversation.	5.9	4.2	28.6	40.3	21
For correct expression of words with new concrete meanings, uses the relation to perceptible objects.	5	11.8	41.2	22.7	19.3
For correct expression of abstract words, uses manipulable objects through perceptual actions.	5	11.8	44.5	16.8	21.8

Source: own processing

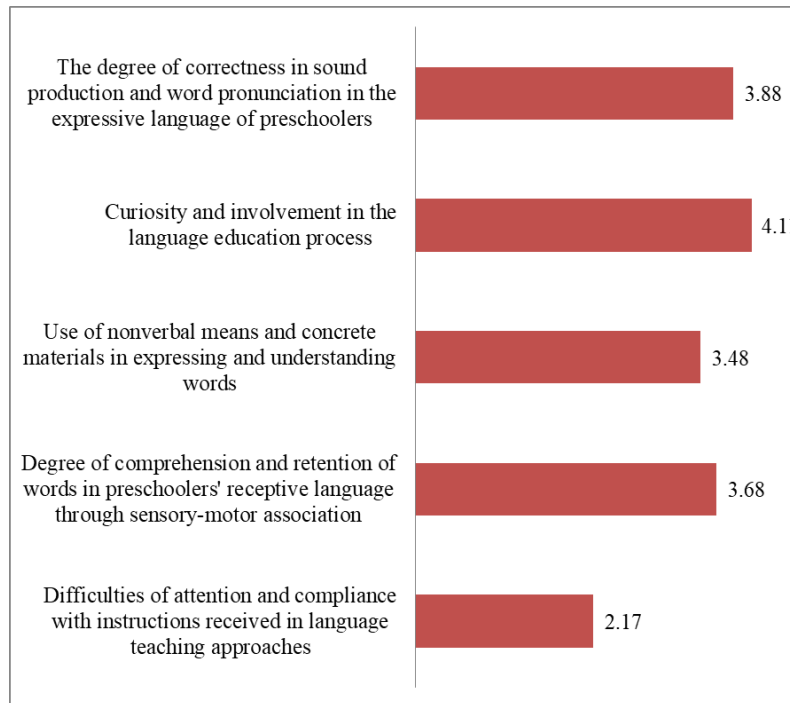
Regarding the use of nonverbal means and concrete materials in expressing and understanding words, most of the preschoolers used nonverbal behaviour (gestures) during a discussion (61.3%), used the relationship with perceptible objects for the correct expression of words with new concrete meanings (42%), but quite a few used manipulable objects through perceptual actions for the correct expression of abstract words (38.6%).



Source: own processing

Figure no. 4.VII. *Curiosity and involvement in the language education process*

Very few preschoolers showed a low level of curiosity and involvement characterized by a lack of participation in group discussions (5.9%) and a lack of asking questions to learn more about certain information (2.5%), or by difficulties in carrying out and successfully completing work tasks (2.5%).



Source: own processing

Figure no. 10.VII. *Graphical representation of the descriptive results of the constructs*

According to Figure 10.VII. „Curiosity and involvement in the process of language education”, „Degree of correctness in sound production and word pronunciation in preschoolers' expressive language”, „Degree of comprehension and retention of words in preschoolers' receptive language through sensory-motor association” and „Use of nonverbal means and concrete materials in expressing and understanding words” recorded mean values towards the maximum score that can be obtained. In other words, most of the preschoolers showed curiosity and engagement, understood and pronounced most words correctly, remembered and could make associations between words and elements in nature, used materials to express ideas, and did not show attention difficulties.

Following the participation of the pre-schoolers in the activities proposed and carried out at group level, the following conclusions were observed:

- young preschoolers showed an openness and attraction to new things, wanting to practise the terms learned and use them in different contexts;
- during games, they showed fair play and the ability to initiate and engage in group activities;

- often used non-verbal means and perceptual objects in their communication and expression;
- participation in activities was achieved by asking questions, completing tasks and engaging in discussions;
- words expressing emotions, figurative or multiple meanings were considered the most difficult to understand;
- factors influencing word comprehension and pronunciation included lack of explanation associated with imagery, attention deficit, poor vocabulary, dyslalia and phonological and phonetic decoding difficulties;
- preschoolers' curiosity and involvement in the language education process were noticeable features, along with correct pronunciation of sounds and words.

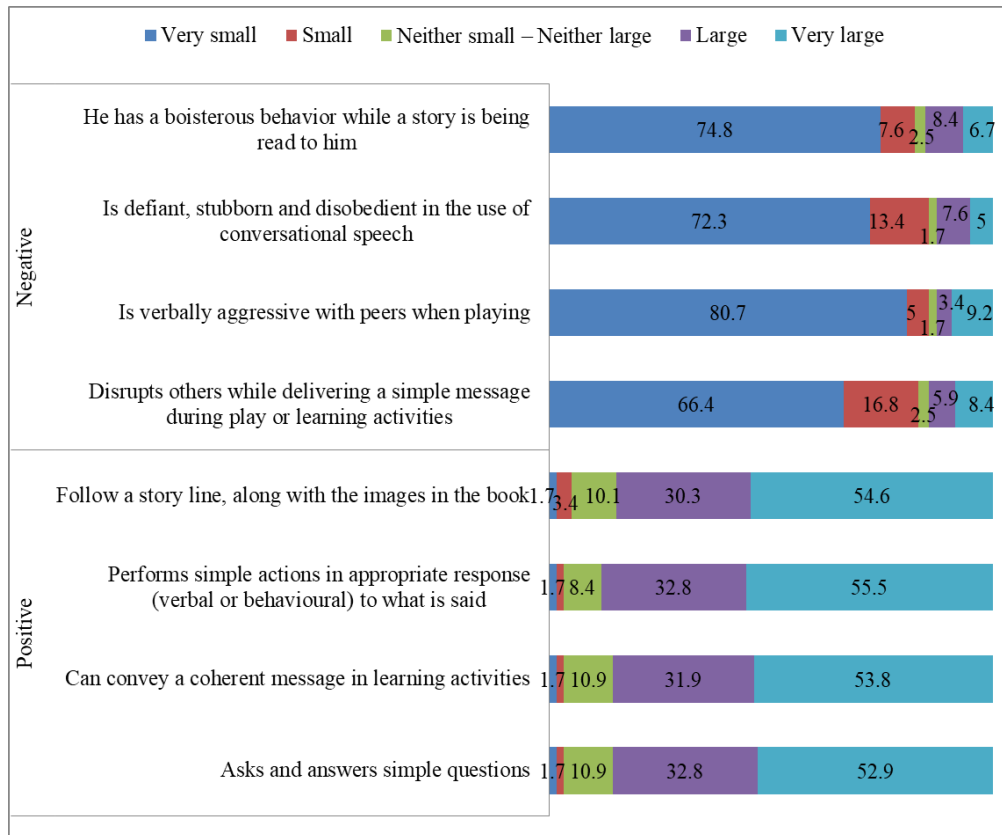
As in the pre-experimental phase, data collected using the Educator-Preschool Rating Scale were entered into IBM SPSS Statistics 20 statistical software. Results were analyzed individually for each indicator assessed.

Table no. 13.VII. *Descriptive analyses of workload orientation*

Workload orientation	Media	Standard deviation	Minimum	Maximum	Sum
Positive	17.29	2.86	8.00	20.00	2057.00
Negative	8.05	5.17	4.00	20.00	959.00

Source: own processing

„Workload orientation” characterized on the two dimensions (positive and negative), captured the difference between the two using the means. The mean of the positive aspects (17.29) was desired to be as close as possible to the maximum value (20), while the mean of the negative aspects (8.05) was preferred to be as close as possible to the minimum value (4).



Source: own processing

Figure no. 13.VII. *Graphic representation of the distribution of understanding and correct use of positive and negative verbal structural meanings*

The lowest frequencies of positive aspects (sum of „low” and „very low” scale scores) were recorded for items that referred to performing simple actions as an appropriate response (verbal or behavioural) to what they were told (3.4%), following the narrative thread of a story along with the pictures in the book (5.1%), conveying a coherent message in learning activities (3.4%) and asking and answering simple questions (3.4%).

According to Figure no. 13.VII. (sum of the „high” and „very high,, scale scores), 15.1% of preschoolers were boisterous when a story was read to them, 14.3% disturbed others while a simple message was conveyed during play or learning activities, 12.6% were verbally aggressive with peers when playing, and were defiant, stubborn, and disobedient when using conversational speech.

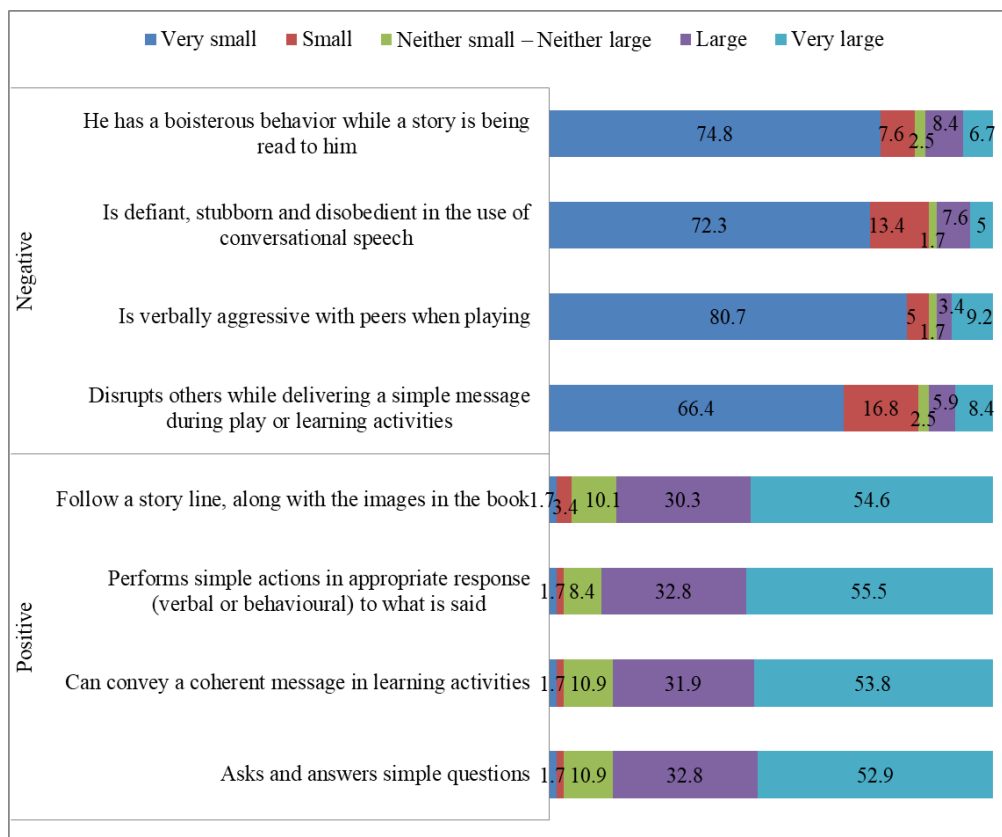
Table no. 16.VII. *Distribution of phonetically, lexically and syntactically correct positive and negative oral expression*

Expression		Very Small	Small	Neither small - Neither large	Large	Very Large
Positive	Pronounces the sounds of the Romanian language (relatively) correctly.		3.4	12.6	30.3	53.8
	Understands the meaning of a word in different learning situations	3.4	3.4	15.1	54.6	23.5
	Uses new words in appropriate contexts	3.4	1.7	19.3	54.6	21.0
	Shows initiative in oral communication and interest	2.5	2.5	16.8	50.4	27.7
Negative	Is an introvert when reciting poetry with respect for intonation, rhythm and pause	26.1	13.4	12.6	17.6	30.3
	Is anxious and anxious when not pronouncing the sounds of the Romanian language (relatively) correctly.	57.1	8.4	10.1	11.8	12.6
	Is frightened and nervous when he does not recognise the initial sound of a word.	61.3	7.6	10.9	9.2	10.9
	Does not form simple sentences about familiar objects and people.	63.0	16.0	4.2	4.2	12.6

Source: own processing

Positive aspects such as pronouncing the sounds of the Romanian language correctly (84.1%), intuiting the meaning of a word in different learning situations (78.1%) and showing initiative in oral communication and interest (78.1%), using new words in appropriate contexts (75.6%), were characteristics of the construct „Phonetically, lexically and syntactically correct oral expression” (sum of „high” and „very high” scale scores).

Negative aspects, such as the lack of composing simple sentences about familiar objects and beings (79%), the preschooler's attitude when not recognizing the initial sound in a word (68.9%), the degree of anxiety and worry when not pronouncing correctly the sounds of the Romanian language (65. 5%), as well as how to recite poems with respect to intonation, rhythm and pause (39.5%), characterized the construct „Phonetically, lexically and syntactically correct oral expression” (sum of „low” and „very low” scale scores).



Source: own processing

Figure no. 1.VII. Graphical representation of buildings

The lowest mean was recorded for „Understanding and correct use of verbal structural meanings” (23.92), representing a lower frequency of items that characterized disruptive, aggressive, disobedient and disruptive behavior, and the highest mean was recorded for „Work task orientation” (25.34), with high frequencies of items on showing initiative and participation in discussions and completing work tasks.

Next, the comparative results obtained in the two pre-experimental and post-experimental stages were presented, with differences highlighted where appropriate.

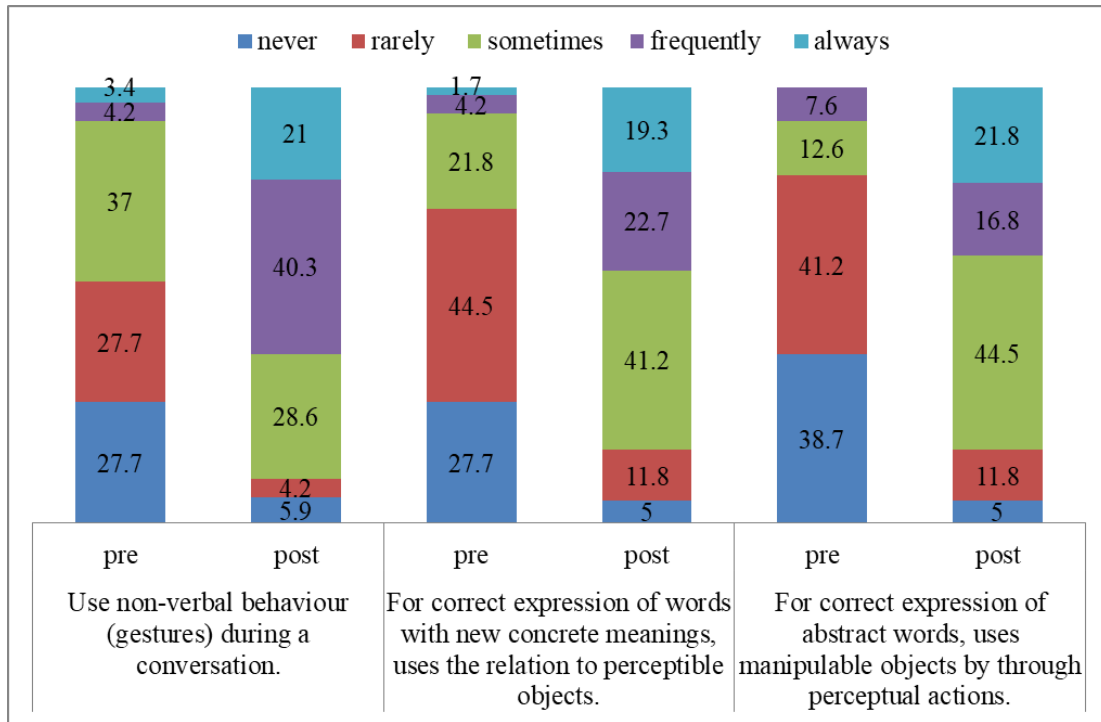
Table no. 23.VII. Comprehension and word retention in preschoolers' receptive language through sensory-motor association in the pre-experimental and post-experimental stages

	Stage	Never	Rar	Sometimes	Frequently	Always
Show fair play, respecting the rules of the game group.	Pre	10.9	31.1	35.3	13.4	9.2
	Post	0.8	2.5	26.1	37.8	32.8
	Pre	16.8	26.1	21.8	23.5	11.8

Initiates different games and activities involving more than one child.	Post	1.7	21.8	16	34.5	26.1
Often uses a picture as a reference to understand the meaning of a word.	Pre	11.8	45.4	35.3	5	2.5
	Post	4.2	3.4	33.6	37.8	21
In order to understand linguistic content, involves the motor and perceptual system as well as bodily interactions with the environment.	Pre	10.9	49.6	32.8	6.7	
	Post	2.5	26.1	16.8	33.6	21
Has the ability to understand messages conveyed through reading, storytelling or audio-visual means.	Pre	6.7	31.9	36.1	21	4.2
	Post	2.5	23.5	9.2	35.3	29.4

Source: own processing

Comparison of the results obtained in the post-experimental stage with the results obtained in the pre-experimental stage showed large and positive differences in terms of: understanding the meaning of a word, often using a picture as a referent (difference between the favourable „frequently-always” responses in the post-experimental-pre-experimental stages, 51.3%), fair play, respecting the rules of the game group (difference between „frequently-always” favourable responses in the postexperimental and pre-experimental stages, 48%), understanding linguistic content, involving the motor and perceptual system, as well as bodily interactions with the environment (difference between „frequently-always” favourable responses in the postexperimental and pre-experimental stages, 47%), understanding the language content, involving the motor and perceptual system, as well as bodily interactions with the environment (difference between „frequently-always” favourable responses in the postexperimental and pre-experimental stages, 47%). 7%), understanding messages conveyed through reading, storytelling or audio-visual means (difference between „frequently-always” favourable responses in the postexperimental and pre-experimental stages, 39.5%) and engaging in different games and activities involving more than one child (difference between „frequently-always” favourable responses in the postexperimental and postexperimental stages, 25.3%).



Source: own processing

Figure no. 23.VII. Graphical representation of the use of nonverbal means and concrete materials in the expression and understanding of words in the pre-experimental and post-experimental stages

In the use of nonverbal means and concrete materials, significant improvements were shown between the pre-experimental and post-experimental results. Thus, in the postexperimental stage there was an increase in nonverbal behaviour (gestures) during a discussion (pre-experimental stage 61.3% and postexperimental stage 7.6%), correct expression of words with new concrete meanings using the relation to perceptible objects (postexperimental stage 42% and pre-experimental stage 5.9%), and correct expression of abstract words using manipulable objects through perceptual actions (postexperimental stage 38.6% and pre-experimental stage 7.6%).

Table no. 25.VII. Curiosity and involvement in language education in the pre- and post-experimental stages

Indicators for assessing pre-schoolers' behaviour	Stage	Never	Rarely	Sometimes	Frequently	Always
Asks questions to find out more information, being curious.	Pre	2.5	42.9	25.2	17.6	11.8
	Post	0.8	1.7	7.6	59.7	30.3

Performs work tasks with ease, completing them successfully.	Pre	26.9	21	18.5	23.5	10.1
	Post		2.5	8.4	61.3	27.7
Takes part in group discussions.	Pre	7.6	43.7	21	16	11.8
	Post	4.2	1.7	5.9	63	25.2

Source: own processing

The items of the construct „Curiosity and involvement in the process of language education” showed significant improvements in terms of: asking questions in order to deepen certain information, being curious (difference between the „favourable” answers in the pre-experimental stage and the post-experimental stage: 60.6%), performing work tasks with ease, completing them successfully (difference between „favourable” responses in the pre-experimental and post-experimental stages: 55.4%), and taking part in group discussions (difference between „favourable” responses in the pre-experimental and post-experimental stages: 60.4%).

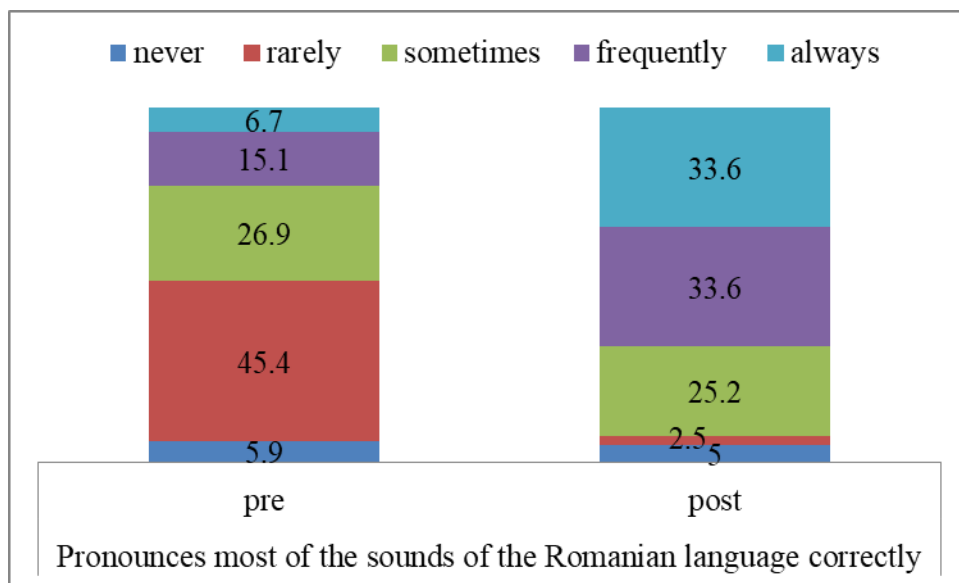
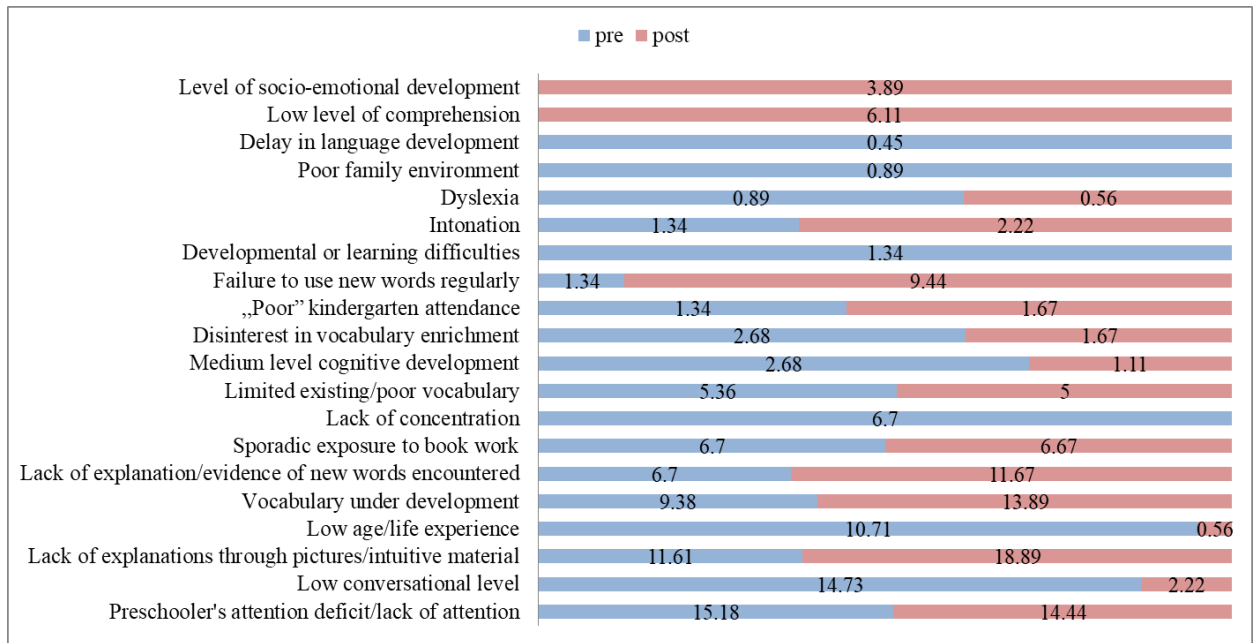


Figure no. 25.VII. *Graphical representation of sensory-motor association in the development of communication skills in the pre-experimental and post-experimental stages*

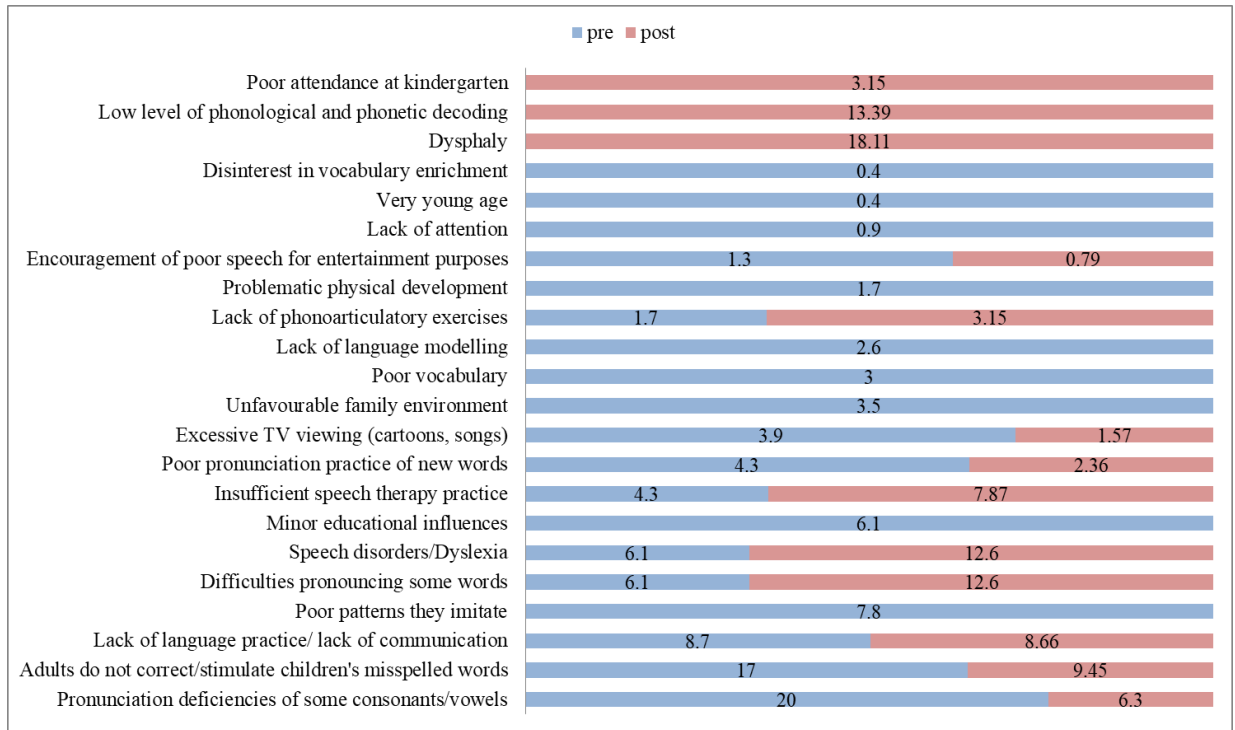
Figure no. 25.VII. shows the difference between the results obtained in the post-experimental stage (sum of the favourable responses „frequently-always” 67.2%) and the results obtained in the pre-experimental stage (21.8%) regarding the correct pronunciation of most of the Romanian sounds. A significant improvement was observed between the results obtained in the two stages.



Source: own processing

Figure no. 28.VII. *Graphing factors that prevent young preschoolers from understanding the meaning of new words in the pre- and post-experimental stages*

In the post-experimental stage, there was a decrease in the factors that prevented young preschoolers from understanding the meaning of new words, but the level of socio-emotional development (3.89%) and the low level of comprehension (6.11%) were the deficient factors encountered after the activities of the educational program in which young preschoolers participated.



Source: own processing

Figure no. 29.VII. Graphical representation of the factors that determine poor pronunciation of new words in young preschoolers in the pre-experimental and post-experimental stages

Only in the post-experimental stage, low kindergarten attendance (3.15%), low phonological and phonetic decoding (13.39%), and dyslalia (18.11%) were mentioned as factors leading to poor pronunciation of new words.

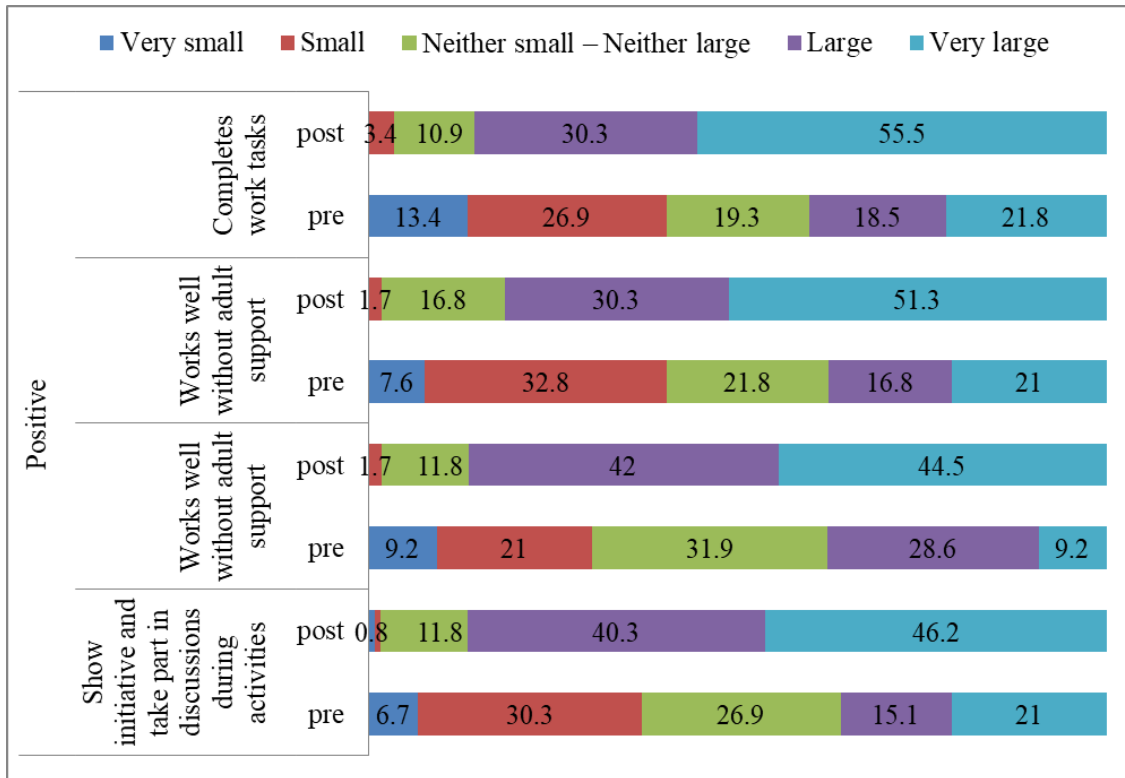
Table no. 32.VII. Statistically significant differences recorded in the pre-experimental and post-experimental stages

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Difficulties with attention and compliance with instructions	38.262	.000	.256	236	.798	.02661	.10402	-.17831	.23153

received in language education approaches									
Comprehension and retention of words in receptive language of pre-schoolers through sensory-motor association	10.527	.001	-9.285	236	.000	-1.02353	.11023	-1.24069	-.80637
Use of non-verbal means and concrete materials in expressing and understanding words	4.711	.031	-12.320	236	.000	-1.40056	.11368	-1.62453	-1.17659
Curiosity and involvement in the language education process	76.762	.000	-11.112	236	.000	-1.30532	.11747	-1.53675	-1.07389
Degree of accuracy in sound production and word pronunciation in pre-school expressive language	.060	.806	-8.640	236	.000	-1.16807	.13519	-1.43440	-.90173

Source: own processing

Next, we present the comparative results obtained in the two pre-experimental and post-experimental phases with regard to the Educator-Preschooler rating scale, highlighting differences where appropriate.



Source: own processing

Figure no. 31.VII. *Graphical representation of the distribution of positive workload orientation in the pre-experimental and post-experimental stages*

Overall, there was a decrease in the frequencies of „low” and „very low” scores, with a difference between the post-experimental and pre-experimental stages in engaging in activities without adult support (-38.7%), completing tasks (-36.9%), showing initiative and engaging in discussion (-35.4%), and contributing to activities even though their attention was drawn to them (-28.5%). These decreases were translated as improvements in the proposed activities.

Table no. 39.VII. *Descriptive analyses of the understanding and correct use of verbal structural meanings in the pre-experimental and post-experimental stages*

Understanding	Step	Media	Standard deviation	Minimum	Maximum	Sum
Positive	pre	12.66	4.75	4	20	1506
	post	17.39	3.29	4	20	2070
Negative	pre	6.05	2.47	4	12	720
	post	6.52	4.75	4	20	777

Source: own processing

The mean value of the scores obtained by the positive aspects in the post-experimental stage (17.39) was 4.73 points higher than the mean value in the pre-experimental stage (12.66), while the mean value of the scores obtained by the negative aspects in the post-experimental stage (6.52) was 0.47 points higher than the mean value of the scores in the pre-experimental stage (6.05). In other words, positive aspects showed greater improvements compared to negative aspects.

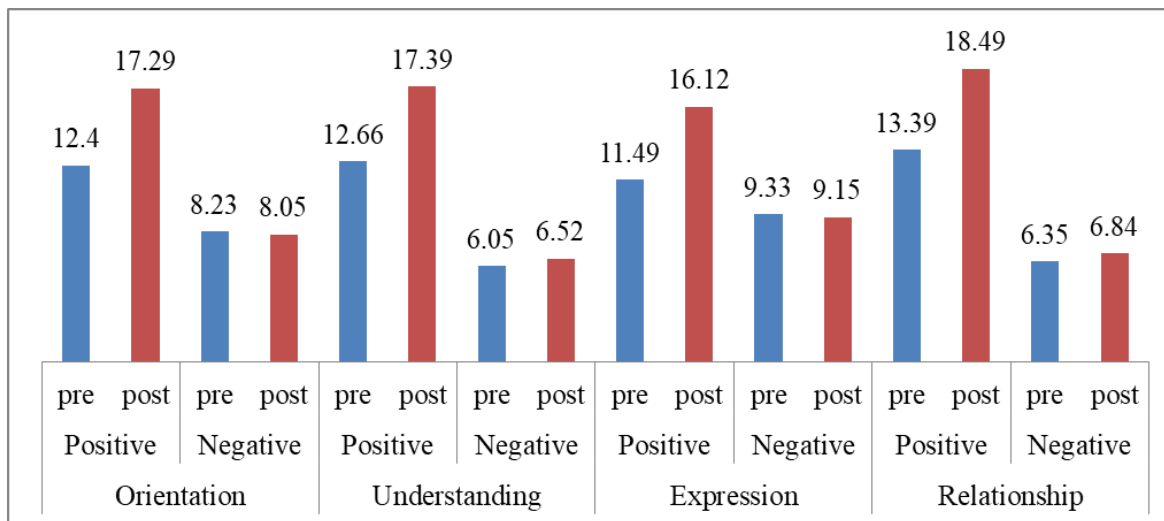
Table no. 40.VII. *Distribution of phonetically, lexically and syntactically correct positive and negative oral expression in the pre-experimental and post-experimental stages*

Expression		Step	Very small	Small	Neither small - Neither large	High	Very large
Positive	Pronounces the sounds of the Romanian language (relatively) correctly.	Pre	2.5	30.3	26.9	17.6	22.7
		post		3.4	12.6	30.3	53.8
	Understands the meaning of a word in different learning situations	Pre	9.2	37.8	20.2	26.9	5.9
		post	3.4	3.4	15.1	54.6	23.5
	Uses new words in appropriate contexts	Pre	24.4	22.7	18.5	28.6	5.9
		post	3.4	1.7	19.3	54.6	21
	Shows initiative in oral communication and interest	Pre	21	26.1	22.7	22.7	7.6
		post	2.5	2.5	16.8	50.4	27.7
Negative	Is an introvert when reciting poetry with respect for intonation, rhythm and pause	Pre	22.7	25.2	26.1	19.3	6.7
		post	26.1	13.4	12.6	17.6	30.3
	Is anxious and anxious when not pronouncing the sounds of the Romanian language (relatively) correctly.	Pre	24.4	30.3	22.7	6.7	16
		post	57.1	8.4	10.1	11.8	12.6
	Is frightened and nervous when he does not recognise the initial sound of a word.	Pre	30.3	44.5	24.4	0.8	
		post	61.3	7.6	10.9	9.2	10.9
	Does not form simple sentences about familiar objects and people.	pre	22.7	43.7	30.3	2.5	0.8
		post	63	16	4.2	4.2	12.6

Source: own processing

Positive aspects, such as showing initiative in oral communication and interest (47.3%), intuiting the meaning of a word in different learning situations (45.3%), pronouncing correctly the sounds of the Romanian language (43.8%) and using new words in appropriate contexts (41.1%), were the items that showed the greatest improvement following the teaching activities proposed in the intervention plan (difference between the sum of the scores of the „high” and „very high” scales in the post-experimental and pre-experimental stages).

Negative aspects, such as not forming simple sentences about familiar objects and people (12.6%), anxiety and worry when not pronouncing correctly the sounds of the Romanian language (10.8%), were less frequent in the post-experimental stage than in the pre-experimental stage (difference between the sum of the „low” and „very low” scale scores in the post-experimental and pre-experimental stages).



Source: own processing

Figure no. 43.VII. *Graphical representation of the newly created constructs on the two positive and negative dimensions in the pre-experimental and post-experimental stages*

Following the activities of the educational programme, a significant improvement was observed in all four positive aspects. Thus, the average value for the positive aspects of „Orientation in the work task” increased by 4.89 points, „Understanding and correct use of verbal structural meanings” increased by 4.73 points, „Phonetically, lexically and syntactically correct oral expression” increased by 4.63 points, and „Relating to peers” increased by 5.1 points. Improvements in the positive aspects of the constructs had a greater impact compared to decreases in the negative aspects, which was only seen for two of the four constructs.

Table no.47.VII. *Differences between construct means in the two stages*

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-post orientation	-4.71	7.83	0.72	-6.14	-3.29	-6.57	118	.000
Pre-post understanding	-5.22	6.50	0.60	-6.40	-4.04	-8.76	118	.000
Pre-post expression	-4.46	9.82	0.90	-6.24	-2.68	-4.96	118	.000
Relating pre-pos	-5.59	7.79	0.71	-7.00	-4.17	-7.83	118	.000

Source: own processing

The teaching activities carried out at group level had a positive and statistically significant ($p < 0.05$) impact on the four constructs analysed. Thus, the mean values obtained in the post-experimental stage by the four constructs: „Orientation”, „Understanding”, „Expression” and „Relating” were significantly different from the mean values obtained in the pre-experimental stage, as a result of the improvements brought by the educational programme.

CHAPTER VIII

CONCLUSIONS AND EDUCATIONAL RECOMMENDATIONS

We defined key concepts and developed stories included in the educational programme. We have also reviewed the significant contributions of different theorists in the field, highlighting the diversity and depth of these contributions.

Hypotheses were tested and confirmed through observational methods and statistical analysis, revealing significant improvements in word comprehension and pronunciation.

Advances were identified in the approach to early preschool language education through the implementation of the embedded cognition-based education program. The data analysed showed significant improvements in word comprehension and pronunciation.

As recommendations for future studies, we proposed including extending the length of the study, diversifying the language education activities, expanding the sample of participants, and using a longitudinal research design to assess children's long-term progress.

Limitations of the research were the relatively small sample size and the absence of a control group, which could affect the generalizability of the results.

Future directions for investigation were suggested, such as long-term evaluation of the educational programme and exploring the interaction between the programme and other environmental factors to improve our understanding of its impact in the educational context.

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