

**ABSTRACT OF THE DOCTORAL THESIS
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**TITLE THESIS: THE ROLE OF SENSORY PROCESSES IN
TRAINING COORDINATIVE ABILITY OF CHILDREN WITH
SIGHT DEFICIENCIES**

Key-Words: sight deficiency, amblyopia, cecity, special education, coordinative ability

Motivation of Subject-Matter Selection

Starting with the importance of the psycho-motric education of a child with sight deficiencies and with the peculiarities of motric learning determined by optical impairment, we are motivated to give - by means of the present study - the answers to a number of questions regarding the psycho-motric education of a child with sight deficiencies, such as:

- ✚ What is the actual development level of the coordination ability for a child with sight deficiency?
- ✚ Which are the major difficulties that make motric learning harder?
- ✚ Up to what point and how can valid senses be trained in order to compensate and support a deficient visual function through physical exercise?
- ✚ Which are the best methods, means and techniques for training coordination in children with sight deficiencies?
- ✚ Which are the best methods for organizing physical education and sport activities in a special school for children with sight deficiencies?

Prerequisites of the Study

In the last years, the professionals' efforts in the field of Physical Education and Sport Theory, adapted for people with deficiencies, have materialized in a series of theoretical studies specifying the objectives, methodic guidelines and forms for organizing and approaching the training and educational process within the physical education class. Knowing how to practically apply these theoretical guidelines and emphasizing the practical

results of their application are objective arguments for supporting any experimental studies in this area of interest.

Particularities and consequences of sight impairment upon somatic and psycho-motric development as described in the specialty literature, as well as the importance of physical exercises in motric education and re-education of a sight-impaired child represent an essential prerequisite in organizing and unfolding the present study.

The whole educational process in a special school for sight-impaired children insists upon poly-sensory education in order to compensate for the visual impairment or total lack of the sight function. We consider that the sensory perceptual experience of school children with sight deficiencies can be significantly improved through Physical Education and Sport specific activities.

General Hypothesis of the Study

Coordinative ability of sight-impaired children can be significantly improved through the application, during physical education classes, of exercise programs for training the main sensory mechanisms (auditory, visual, tactile-kinesthetic and vestibular).

Purpose of the Study

□ The purpose of this study is to improve the quality of the educative and training process of physical education and sport classes addressed to sight-impaired children.

The purpose of this study is subordinated to the current and prospective purpose of the educative and training activities for children with special educational needs, meant to increase their life quality.

Objectives of the Study

In order to create a more substantive and realistic image of how working strategies of a physical education professional can solve a whole range of psycho-motric problems specific to sight-impaired children, we have set ourselves the following objectives:

□ To identify the psycho-motric development characteristics of a sight-impaired child, the deficiencies associated therewith and the neglected or undeveloped motric habits.

□ To establish the activities that are contraindicated for people with this type of disability based on medical recommendations, in order to completely exclude all risk factors.

□ To make physical education classes more appealing, to encourage and educate people that physical exercise in their spare time should be a common habit, all these by using more pleasant and interesting learning environments.

□ To establish the best activities, methods and means for intervening in this area of interest by testing a psycho-motric development program which main tasks refer to: training of balance ability, space orientation ability and movement coordination and adjustment ability.

Research Methods Used

- Bibliographic study
- Observation
- Experimental method - unfolded in two steps:
 - Pilot experiment - Preliminary study.
 - Base experiment
- Data analysis and interpretation methods
 - Statistical method for data processing and interpretation
 - Graphic method.

Subjects of the Study:

1. Pilot experiment. The subjects of the pilot experiment are a sample of 30 sight-impaired children, pupils of 3rd, 4th and 5th grades.

2. Base experiment. The research has been performed on a sample of 50 subjects, pupils of 4th, 5th and 6th grades. Three groups have been set at sample level, depending on the type of sight impairment (sightless, severe amblyopia and medium amblyopia).

The three groups are as follows:

- **Group G1** – 10 sightless pupils
- **Group G2** – 23 pupils with severe amblyopia
- **Group G3** – 17 pupils with medium amblyopia

Location – School for Sight-Impaired Children, Bucharest.

Experiment Variables

- **Quantity Related Variable** – *Coordinative ability.*
- **Independent Variable** – *Special program elaborated for training coordinative ability of sight-impaired children.*

Experiment Steps

The base experiment of this study has been done between October 2007 and May 2008, and its structure includes the following three steps:

- **Step I** – aimed at observing *the training of space orientation ability*, has been performed between 22 Oct. – 21 Dec. 2007;
- **Step II** – aimed at observing *the training of balance ability*, has been performed between 11 Feb. – 28 March 2008;

□ **Step III** – aimed at observing *the training of movement coordination and adjustment ability* has been performed between 3 March and 25 April 2008.

Each step of the base experiment has included the following activities:

1. *Assessment* of the coordinative ability development level, by means of initial and final tests.

With the purpose of assessing the coordinative ability, we have used the following **batch of tests and trials**:

➤ *For the assessment of the static balance and kinesthetic differentiation abilities:*

- **Trial E₁** – Assessment of bipodal balance;
- **Trial E₂** – Assessment of unipodal balance – left leg;
- **Trial E₃** – Assessment of unipodal balance – right leg.

➤ *For the assessment of the time-space orientation ability*

- **Test** for assessing the space orientation and distance estimation abilities, with the following items:
 - *Item 1 (O₁)* – Assessment of distance estimation ability;
 - *Item 2 (O₂)* – Assessment of vestibular-motor coordination ability.
- **Trial O₃** – Assessment of space orientation ability with the aid of auditive cues;
- **Trial O₄** – Assessment of space orientation ability with the aid of tactile cues.

➤ *For the assessment of the movement coordination and adjustment ability*

- **Trial CO₁** – Assessment of the inter-segment coordination
 - *Item 1 (C1)* – Assessment of upper limbs coordination
 - *Item 2 (C2)* – Assessment of lower limbs coordination
 - *Item 3 (C3)* – Assessment of upper and lower limbs coordination
- **Trial CO₂** – Assessment of hand to object coordination ability.

2. *Independent variable application.* For each type of coordinative ability, the programs have been implemented during 10 classes, within the main part of each physical education and sport class, for a period of 25-30min.

Conclusions drawn as a result of the pilot experiment

The peculiarities for organizing and coordinating a physical education and sport class in a special school for sight-impaired children can be presented as follows:

➤ There are increased difficulties in organizing and coordinating a physical education class for mixed groups (amblyopia and sightless);

- We take notice of a severe deficit of physical education and sport professionals for this type of education;
- The physical education teacher may not coordinate and teach disciplines related to psycho-motric education and re-education as per the curriculum Specific and Compensation Therapies. According to legal regulations, these activities can only be organized and coordinated by special psycho-pedagogy professionals.

Considerations regarding peculiarities of psycho-motric development in sight-impaired children:

- We have observed that the type and severity of the sight deficiency has a significant impact on the development level of the coordinative ability in sight-impaired children;
- Association of the sight deficiency with mental deficiency (mild form of retardation) does not cause significant changes in the development level of the coordinative ability;
- Delays in the motric development of a sight-impaired child are not a direct consequence of the sight deficiency in itself;
- The main reason for defective motric development is the lack of adequate education, both during pre-school period and in the first school years;
- The integration of sightless pupils in amblyopic groups and the coordination of physical education classes by a single professional generate unfavorable conditions for practicing physical exercise at the actual ability level of all pupils.

Recommendations for best improvement of the physical education and sport class in special schools for sight-impaired children:

- Coordination of the physical education classes by specialized teachers starting with primary school;
- Training within specialty high level education of the adapted physical education and sport professionals, in order to ensure their competence in coordinating the disciplines included in the curriculum Specific and Compensation Therapies;
- Organizing facultative and extra-curriculum classes by groups formed based on the type of sight deficiency and the level of motric development;
- Coordination of the physical education class, especially in the case of mixed groups, by the physical education teacher accompanied by a member of the multidisciplinary team (educator, itinerant teacher);

Conclusions drawn as a result of the base experiment

After the statistical processing of the results registered by the experiment subjects, in the two phases of the experiment, i.e. before and after applying the independent variable, we have drawn the following conclusions:

□ Our statistical hypothesis is partially confirmed, as – from statistical point of view - significant improvement of the average values has been registered only for the following components of the coordinative ability:

- Bipodal balance
- Unipodal balance
- Vestibular-motor coordination ability
- Space orientation ability with the aid of auditive cues
- Space orientation ability with the aid of tactile and kinesthetic cues

cues

- Hand to object coordination ability

□ From statistical point of view, no significant progress of the registered average values has been obtained for the following components of the dependent variable:

- Distance estimation ability
- Inter-segment coordination ability.

With reference to the progress of the experimental group from the initial testing to the final one, we have noticed an improvement of the coordinative ability in all three assessed variable, even though for some components of the coordinative ability (distance estimation ability and inter-segment ability), no statistically significant progress has been registered.

We consider that the low progress registered by the pupils at the trials applied for the assessment of the *inter-segment coordinative ability* is due, among others, to the fact that its training through the applied program has not represented any novelty to the pupils. Exercises implying inter-segment coordination are present in all preliminary parts of a physical education class.

As regards the *distance estimation ability*, we have noticed that the statistically insignificant progress registered by the pupils in our experimental group has been affected by the subgroup of pupils with *severe amblyopia* who registered poorer results at the final testing compared to the initial one.

The significant improvements of the coordinative ability observed upon statistical data processing enable us to consider that the *Programs Elaborated and Applied* by us during this study represent an *important factor in training coordination of sight-impaired children*. The results obtained emphasize the important role of *sensory oriented exercises* in the efficient training of coordinative ability of sight-impaired children.

We consider it necessary that such a program is implemented in relation with other programs targeting also the development of *conditional and intermediary abilities*.

Conclusions regarding the Role of Sensory Processes in Training Coordinative Ability of Sight-Impaired Children

The usefulness of applying a *Specially Designed Program for Training Coordinative Ability of Sight-Impaired Children* is remarkable in terms of benefits to the children development, as pointed out below:

✚ The enrichment of sensory-perceptive experiences generates in the mind of sight-impaired children a new perspective upon the various possibilities they have to establish relations with their own body and with the environmental variables.

✚ The strain upon all sensory mechanisms in accomplishing motric tasks trains in a compensatory way the functions of the valid analyzers, thus optimizing their functional level and contributing to the enrichment diversification of the sensory-perceptive experiences of the program participants.

✚ The possibilities for *educating coordinative ability* are subject to the *quality of sensory processes*, and at the same time, physical exercise is, through its variety and complexity, an important instrument in the training of these processes.

✚ During the program unfolding, besides accomplishing different motric actions, the pupils were required to verbally describe certain positions, movements, objects and devices, which lead to the correction and enrichment of their *conceptual and representational fund*.

Original Contribution Brought to the Expansion of the Knowledge Area regarding the Education of Sight-Impaired Children

Theoretical Contributions

✚ We appreciate that the analysis and presentation of the studied bibliographic material represent an important theoretical guideline for physical education and sport professionals and not only, who are interested in the thorough study of Physical Education and Sport adapted for children with sight deficiencies.

✚ Based on the bibliographic study, we have presented numerous elements of knowledge with reference to the *problematic of educating children with special education needs in general*, and those with sight deficiencies in particular.

✚ We have presented the new *legislative regulations*, based both on the European legislation and on the national one, regarding education, health and social and professional integration of children with special educational needs;

✚ We have pointed out some *contradictory aspects* between the current legislative visions and trends regarding the organization of the education process for pupils with special educational needs, and the actual conditions of school practice.

✚ We have indicated several *peculiarities related to body development and which are determined by the visual analyzer dysfunction*.

✚ We have emphasized that the delays in the somatic and psychomotoric development of a sight-impaired child result from defective education or lack of psychomotoric education, especially in the first years of life. Therefore, we have pointed out the *role and place of the physical education and sport professional in the multidisciplinary team of a special school for sight-impaired children*.

✚ We have proposed to the professionals in the physical education and sport field a new approach when setting objectives for the physical education and sport activities, that is from the perspective of the *poly-sensory compensation* that physical exercise performed in different informational conditions can provide to sight-impaired children and not only.

✚ We have outlined the priorities of psychomotoric education of sight-impaired children based on the growing and development characteristics mentioned in the specialty literature, but also on the conclusions drawn from the scientific experiment of this study.

Applied and Methodic Contributions

✚ We have conceived and applied *control trials for the assessment of coordination ability in sight-impaired children*, taking into account visual perception characteristics determined by the diminution of visual acuity and the absence of sight function.

✚ We have conceived and applied a *Special Program for Training Coordinative Ability of Sight-Impaired Children*. Through the elaboration and practical experimentation of this program, we have proposed to physical education and sport professionals a new approach on the *possibilities to adapt physical education specific means* for a complex and diversified stimulation of the valid sensory mechanisms, an essential condition to obtain compensation in the case of children with sight deficiencies.

✚ We have contributed to the demonstration of the *sensory processes' role*, as well as their actual training, through physical education specific means adapted to the characteristics generated by the dysfunctions of the visual analyzer, when training coordinative ability of children with this type of deficiency.

✚ With reference to the best improvement of the *instructive and educative process within the physical education and sport class* performed at the level of amblyopic and sightless pupils, we have suggested to have

facultative classes organized in homogenous groups of pupils, based on the type and severity of their sight deficiency and their motric development level.

✚ Our participation, together with the physical education and sport teacher from the institution where the study took place, to the experimentation of the conceived program has concurred to the practical application of the „teaching partnership” concept. We have thus strengthened the idea that this didactic method represents one of the solutions which may lead to surpassing the difficulties of organizing and coordinating a physical education class both for amblyopic and sightless pupils.