

MINISTRY OF EDUCATION AND SCIENTIFIC RESEARCH
NATIONAL UNIVERSITY OF PHYSICAL EDUCATION AND SPORTS
OF BUCHAREST
DOCTORAL SCHOOL
BUCHAREST, 2015

Abstract of doctoral thesis

**DEVELOPING MOTOR CAPACITY OF PUPILS WITH VISUAL
IMPIREMENTS BY APPLYING DIFFERENTIATED TREATMENT IN THE
PHYSICAL EDUCATION LESSON**

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Keywords: differentiated treatment; motor capacity; amblyopia; blindness; physical education lesson; operational modules; tests; assessment.

Introduction:

Physical education and sports, as motor activities, are addressed to both normal and disabled people. Unlike other subjects in the curriculum, these ones have a distinct particularity given by the individual's capacity for intellectual, affective, motor and social training.

In terms of diversification in the content of physical education activities, creative and innovative ideas are increasingly promoted; in this respect, we shall use *differentiated treatment*, known in the specialized literature as a binomial, under the form of both a method (way) and a principle (requirement).

Acquisition of new forms of behavior/adaptation in persons with special educational needs requires the existence of terms whose meaning must be unanimously known by all specialists in the field. In physical education and sports, the terms used to this purpose are represented by: curricular adaptation, involvement, special educational needs, health condition, impairment, disability/incapacity, inclusive education, integrated education, special education, contextual factors, functioning, handicap, inclusion, integration, well being.

As a general conclusion, beyond the multitude of terms used, it is imperative to understand the concepts according to the approach angles, emphasizing clearly the content and meaning of each word used, so that the persons to whom we address do not feel stigmatized and segregated.

In recent decades, at both the national and international levels, the concern of specialists for people with disabilities has been and is still marked by an upward trend, caused by the increasingly higher number of persons in this category, and materialized in various implementations of laws, projects, decisions, orders, declarations, conventions, reports. They were programmed for facilitating and making efficient the education of people with special educational needs, but also for increasing their quality of life.

Motivation for choosing the theme:

In developing the doctoral thesis, we started from the following motto: "I am searching for the *light* that I cannot see with my eyes, because the sign of my destiny is darkness".

School physical education, through the variety of its practical means, the complexity and difficulty of theoretical aspects it imposes, offers the specialists a vast field of research. Today's society, through its social culture, has evolved and has concerns for all categories of persons involved in the system, aiming at the formative aspect of pupils in mass education, but being also interested in the integration/inclusion of pupils with special educational needs. But the issue related to the development and training of visually impaired persons is insufficiently addressed nowadays compared to the figures which record an increase in their number at the world and national levels, in recent decades.

During professional training, our concerns have converged to different forms of research aiming at the efficiency of differentiated treatment in physical education lessons conducted in mass pre-university education (*Study regarding the efficiency of using differentiated treatment in 5th grade, within the physical education lessons for motor qualities*) and special education (*Study regarding the efficiency of using differentiated treatment within the physical education lessons for motor qualities in special education*), in order to develop motor qualities, mainly the conditional ones.

Within our doctoral studies, we want to achieve an experimental research that will try to prove the efficiency of differentiated treatment in physical education lessons for pupils with visual impairments.

We consider it important to plan and develop an experimental research in this field, in order to achieve an expansion of knowledge corresponding to this area of interest. We are convinced that this work will be followed by new experiments aimed to analyze and search for innovative information and facts that will capture reality as

it is, that will succeed in completing the picture of specialized literature at the national level.

This thesis aims to achieve a theoretical, conceptual framework and a practical, experimental one regarding motor capacity in visually impaired pupils. The work is structured in three parts:

- ⊗ Part I: Theoretical, conceptual and methodological background of the theme;
- ⊗ Part II: Preliminary experimental research;
- ⊗ Part III: Final experimental research.

Part I includes five chapters and deals with updated theoretical notions in the field of adapted physical education.

In chapter 1, we addressed issues relating to motor capacity, motor aptitudes, motor skills and abilities.

Chapter 2 contains the definitions, etiology, classification, incidence and dynamics of visual impairments at the national and international levels.

Chapter 3 catches the emergence and definition of the concept, the content and characteristics of differentiated treatment.

Chapter 4 presents the morphological, functional, motor and psychological particularities of visually impaired pupils in the pubertal period.

Chapter 5 reveals the conclusions drawn from the theoretical, conceptual and methodological background of the theme.

Conclusions:

- ⊗ Adolescents with visual impairments need improvement of their ability to explore the environment, so we have to ensure a fully secure climate for this. At the same time, auditory clues will be necessary for the formation of representations and, subsequently, for performing movements. Special attention will be paid to the development of body alignment, general fitness and motor fitness, balance, spatial orientation, coordination and development of different movement patterns.
- ⊗ Educating and training persons with special educational needs require knowledge, at the conceptual level, of terms which, when used, should not produce negative emotional vibrations in individuals with disabilities.
- ⊗ Success in any activity is achieved not only due to the improvement of perceptual actions, but also to the formation of new schemes that involve other analyzers and compensate the drawbacks resulting from impairments.

- Ⓢ Differentiated treatment by value groups is a method that ensures increased school performance, eliminates learning gaps and provides pupils the opportunity for self-assertion, according to personal abilities.

Part II, *Preliminary experimental research regarding the biomotor potential of pupils with visual impairments in special schools versus pupils without visual impairments enrolled in mass education* is structured in 10 chapters.

Premises: In physical education, it is not possible to design a preparation program based on the achievement of elaborated scientific objectives before knowing the level of innate characteristics (motor aptitudes).

The main objective of preliminary experimental research is to seize, note, record and highlight some differences and/or similarities in the somatic and motor spheres between the performances achieved in assessment tests by pupils without visual impairments enrolled in a mass school and pupils with visual impairments enrolled in a special school (which results in knowing the motricity level of pupils with visual impairments).

Purpose: Preliminary experimental research aims to achieve a biomotor profile of visually impaired pupils in middle school. It also aims to make a comparative analysis between the motor potential of pupils *with visual impairments* attending special schools and pupils *without visual impairments* attending mass schools.

Main hypothesis:

Applying the *Brockport Physical Fitness Test Battery* to pupils with visual impairments and pupils without visual impairments in middle school cycle will outline their somatic and motor profile, which will reveal significant differences in the somatic and motor spheres.

Subjacent hypotheses:

Applying the *Brockport Physical Fitness Test Battery* will highlight aspects related to:

IS₁: the aerobic capacity level in pupils with and without visual impairments.

IS₂: the values for height, weight and body mass index proper to pupils with and without visual impairments.

IS₃: the level of muscular strength, muscular endurance and suppleness in pupils with and without visual impairments.

Research sample: The research sample is made up of 96 subjects (30 adolescents with visual impairments and 66 adolescents without visual impairments) attending middle school.

Location and stages of preliminary experimental research: The first sample is from *Special Middle School for Visually Impaired*, and the second one from “*George Bacovia*” Middle School no. 111.

Research methods used in the preliminary experimental research: In order to develop the entire theoretical, practical and experimental approach, we used specific scientific research methods unanimously known in our field: bibliographic study, observation, conversation, experimental method, test method, statistical and mathematical method.

The test battery used to assess the fitness level of pupils with and without visual impairments is represented by *The Brockport Physical Fitness Test, State University of New York, College at Brockport - Joseph P. Winnick, Francisc X. Short*. The Brockport Test appeared in 1999, under the auspices of the University of New York, due to the contribution of authors Joseph P. Winnick and Francisc X. Short, as a result of a project conceived in 1993. The project included a total of 1542 young people with mental retardation, congenital anomalies, amputations, spinal cord injuries, cerebral palsy, *blindness, amblyopia*, but also healthy persons. The test contains 27 items that can be applied according to each individual. Generally, for an individual, the battery can be made up of 4 to 6 items.

In the preliminary experimental research, six items were applied for knowing the fitness level of pupils with and without visual impairments: Flexion and extension in the elbow joint, Trunk extension from dorsal decubitus, Trunk lifts from dorsal decubitus, 20m Shuttle run, Trunk flexion from sitting position, Body mass index.

Conclusions:

- ⊙ After analyzing the obtained results, we can assert that application of the *Brockport Physical Fitness Test Battery* to pupils with visual impairments and pupils without visual impairments in middle school cycle has shaped their somatic and motor profile, which will emphasize significant differences in the somatic and motor spheres – **the main hypothesis is confirmed.**
- ⊙ After applying the *Brockport Physical Fitness Test Battery*, there were emphasized: the aerobic capacity level in pupils with and without visual impairments, the differences and/or similarities related to the values for height, weight and body mass index proper to pupils with and without visual impairments, the level of muscular strength, muscular endurance and suppleness in pupils with and without visual impairments – **the subjacent hypotheses are confirmed.**
- ⊙ After analyzing the research in the field, we can state that motor performance in adolescents is relative, varying depending on the type of disorder, gender, age, motor task, preparation level.

- Ⓢ In terms of biomotor potential, because the approximate values for all items were in favor of pupils enrolled in mass education, we consider it necessary and appropriate to design a differentiated school syllabus model, according to the particularities of subjects involved in the activity. We agree to the idea that, by preparing a specially designed program for pupils with visual impairments, better performances can be achieved, in terms of motor capacity.

Part III, *A staged diagnosis on the development level of motor capacity in visually impaired pupils by applying differentiated treatment (aspects related to research methodology/design)* is structured in 11 chapters.

Premises: School physical education has a key role in fulfilling the tasks and objectives at the functional, motor, psychomotor, cognitive, affective and social levels. Introducing some operational modules, differentiated according to each one's motor potential and individual particularities, in the physical education lessons for pupils with visual impairments may lead to development of their motor capacity.

The main objective of experimental research is to develop motor capacity in pupils with visual impairments, using the operational modules designed for each value group (value groups were created after applying initial assessments to grades 5th – 8th) of the experimental classrooms.

Purpose: The aim of the research is to make efficient the instructional and educational process for visually impaired pupils, by applying differentiated treatment.

Main hypothesis 1:

In the physical education lesson, application of differentiated treatment depending on motor potential will contribute to developing motor capacity of visually impaired pupils in middle school cycle, enrolled in special education units.

Subjacent hypotheses:

IS₁: In the physical education lesson conducted in special schools, application of differentiated treatment depending on motor potential will lead to development of motor aptitudes in pupils with visual impairments in middle school cycle.

IS₂: In the physical education lesson conducted in special schools, application of differentiated treatment depending on motor potential will positively influence the process of forming motor skills specific to athletics, basketball and gymnastics.

Main hypothesis 2:

In special education, application of differentiated treatment will lead to know the satisfaction level of pupils with visual impairments in relation to the physical education lesson and its usefulness in personal and everyday life.

The sample of final experimental research: Subjects included in the final experimental research are pupils with visual impairments in middle school cycle, grades 5th, 6th, 7th and 8th. Classrooms are mixed, including both pupils with amblyopia and blindness, girls and boys. The 59 subjects assessed in the experimental research are enrolled at the *Special Middle School for Visually Impaired*, a public education institution located in Bucharest, 33 Austrului Street, sector 2.

Research methods used: directed observation, questionnaire survey, conversation method, trials and controls, experimental method, assessment tests, statistical and mathematical indicators, Box-and-Whisker-Plot Analysis, Mann-Whitney Test, T-Test for independent samples, Effect Size Index and Wilcoxon Test.

The content of final experimental research: Experimental activity was carried out within the physical education lessons, in programs distributed on two days per week for grades 5th, 6th and 7th, and one day per week for 8th grade.

It should be noted that this research covers two *directions*:

- the first direction refers to developing an experiment based on the *application of differentiated treatment* during physical education lessons conducted in special schools;
- the second direction consists in *designing a school syllabus model/ sketch* for pupils with visual impairments.

The first direction of final experimental research refers to the efficiency of using differentiated treatment in special education classrooms, particularly in visually impaired pupils. This research uses 5 experimental groups and 3 control groups.

Experimental and control groups are applied the same controls and assessment tests, both in the initial and final stages of the research.

Experiment groups will benefit from the application of differentiated treatment, while control groups will follow specific preparation used in traditional physical education lessons.

During lessons, experiment classrooms worked by value groups created after applying initial assessment, being related to two valences of the differentiated treatment, namely motor potential and ophthalmic disorders of visually impaired subjects. It should be noted that pupils' work was not differentiated by associated disorders, for instance their involvement into a specific exercise program for the systolic murmur, but instead, exercises were directed taking into account the subjective data of each participant. Differentiated treatment was not done by gender, given the small number of girls and/or boys in some classrooms.

Value groups have a closed character, which does not allow pupils to migrate from one status to another while the preparation program is in progress.

After applying initial assessment, the subjects can find themselves in the first value group for one of their motor aptitudes/skills and in the second value group for

another motor aptitude/skill. Distribution by value groups was achieved depending on pupils' performances in the applied trials/ assessment tests. For each trial/test separately, assessment scales were purposely designed. In compliance with these assessment scales, pupils' performances were converted into points, which determined the value group for each pupil in the experiment group.

Distribution by value groups was based on the arithmetic means of the points scored for each motor aptitude/ skill assessed according to the designed interval of values.

During physical education lessons, different steps are taken in the instruction and education process, each value group being stimulated depending on their motor potential (differentiated treatment).

Thus, the tasks performed by the subjects differ from one group to another:

- value group I: characterized by increasing the intensity of effort, performing various exercise structures and progressing in the complexity of effort;
- value group II: characterized by decreasing the intensity of effort, performing simpler exercises, decomposing and analytically learning the skill, increasing the amount of effort, augmenting the information received through visual and auditory pathways, which is materialized in using demonstrations and explanations.

These different tasks assigned to the subjects are the result of each one's particularities.

Final assessment will be applied to both the experimental and control groups.

Tests and trials applied in the final experimental research are represented by:

	Assessed components	Form of manifestation	Tests/ Trials to be assessed
MOTOR APTITUDES	Speed	Movement speed Repetition speed Reaction speed	- 5x5m Shuttle run; - Plate tapping; - Time trial.
	Strength	Segmental muscle strength	- Squat test; - Bench press; - Kraus-Weber strength tests.
	Endurance	Aerobic endurance	- 15m Shuttle run.
	Suppleness	Joint mobility Muscle, ligament and tendon elasticity	- Dynamic flexibility test; - Frontward mobility test; - Test for assessing mobility of the ankle; - Test for assessing mobility of the shoulder and wrist; - Elsensohn test.
	Coordination Capacities	Spatial-temporal orientation Kinesthetic sensitivity Static balance Ability and agility	- Trial for estimating distance; - Trilogy of sounds; - Trial for estimating weight; - Sensitized Romberg test; - Unipodal support balance test; - Burpee test.

MOTOR SKILLS	Athletics	- 10m speed running.
	Basketball	- Multiple dribbling with the skillful and unskillful hands.
	Gymnastics	- Support scale; - Bridge; - Stand on the shoulder blades.

The second direction of final experimental research focuses on drawing up a school syllabus model that will be translated under the form of two vectors, which aim at achieving the same objectives:

- the syllabus is a result of the necessity to treat visually impaired pupils in a differentiated way;
- the syllabus is a guide to conducting the entire practical activity during physical education lessons for pupils with amblyopia and blindness.

All the aforesaid led us to sketch, at the end of the research, a school syllabus model for pupils with visual impairments attending the physical education lesson.

The school syllabus model for physical education and sports, special education, pupils with visual impairments, has a well-determined structure: presentation note, general competences, values and attitudes, specific competences, learning contents and organizational aspects regarding the physical education activity. The program results have not been quantified and its effects have not been proved.

Conclusions:

- ⊙ After analyzing the achieved results (the progress rates have higher values as follows: -36.1% for speed, 66.7% for strength, 300% for suppleness, 252% for coordination capacities, 60% for endurance, -20% for athletic skills, 21.3% for gymnastic skills and 27.3% for basketball-specific skills, values which are in favor of experimental groups, where differentiated treatment has been applied), we can assert that *the main hypothesis* of final experimental research **is confirmed**.
- ⊙ After interpreting the results achieved by pupils in the trials or assessment tests (lower speed by up to 13 hundredths in Time trial, 5 seconds in Plate Tapping, 11 seconds in 5x5m Shuttle run, increased number of repetitions by 9 in Squat test, 2 lengths in Bench press, 13 points in Kraus-Weber strength test, 2.5 cycles in Dynamic flexibility, 6 cm in Flexibility test, 5 cm in Elsensohn test, 5 cm in Tests for assessing mobility of the shoulder, wrist and ankle, decreased number of mistakes by 3.5 in the Trial for estimating weight, increased number of seconds in position maintaining by up to 11 seconds in Tests for assessing static balance, closeness to the point 0 in the Trial for estimating distance, items 1 and 2, decreased number of seconds by 5 in the Trilogy of sounds, increased number of repetitions by 2 in Burpee test, increased number of laps by 9 in 15m Shuttle run),

we can conclude that *the first subjacent hypothesis* of final experimental research **is confirmed**.

- ⊙ *The second subjacent hypothesis is confirmed* following the statistical processing of data (decreased time in covering the 10 meters by 0.60 seconds, increased average grade in gymnastic skills by 1.50 points and increased average grade in basketball-specific skills by 2 points).
- ⊙ After studying pupils' responses to the satisfaction questionnaire (97% of them are content with the quality and clarity of teaching physical exercises, 93.9% believe that application of differentiated treatment during lessons is efficient, 84.8% mention that they have socialized a lot after the teamwork, 72.7% assert that they trust their group partners, 100% express their contentment with physical education lessons, and overall assessment of physical education lessons receives 9.85 points out of a possible 10), we can state that *the second main hypothesis is confirmed*.
- ⊙ After analyzing and interpreting the results, we can conclude that, as regards the progress rate, experiment groups benefiting from the application of differentiated treatment have recorded an upward trend which is statistically significant compared to control groups.
- ⊙ We highlight the urgent need for designing both a special program for children with visual impairments and the special school syllabus for this category of pupils.

Acknowledgements

This paper is made and published under the aegis of the National University of Physical Education and Sports from Bucharest, as a partner of program co-funded by the European Social Fund within the Operational Sectoral Program for Human Resources Development 2007-2013 through the project Pluri- and interdisciplinarity in doctoral and post-doctoral programs, Project Code: POSDRU/159/1.5/S/141086, its main beneficiary being the Research Institute for Quality of Life, Romanian Academy.