



DIFFERENTIATED INSTRUCTION IN OPTIMIZING THE LEARNING PROCESS OF SPECIFIC SKILLS OF ATHLETICS, GYMNASTICS AND BASKETBALL FOR VISUALLY IMPAIRED PUPILS FROM 6TH GRADE

Virgil TUDOR¹

Ana-Maria MUJEA²

Cristina-Georgiana VĂRZARU³

Abstract

The present research has as a main aim principal the formatting of specific skills of athletics, gymnastics and basketball for visually impaired pupils from 6th grade, enrolled in special educational units. The premise of the research targets the efficiency of differentiated instruction utilisation, in physical education lessons. The research methods used in this paper are represented by directed observation, experimental method and basic statistical indicators as mean, standard deviation and coefficient of variance, Wilcoxon Test, rate of progress and Mann-Whitney U Test. The experimental study contains two group: an experimental group and a control group. There were applied tests that targets specific athletics skills (10m Sprint Test), gymnastics skills (Watershed, Bridge and Standing on shoulder blades) and basketball skills (Multiple dribble with one hand at a time). Results obtained by the experimental group are better than control group, which entitles us to affirm that differentiated instruction proves its usefulness also in the case of formatting the specific motor skills.

Keywords: *physical education lesson, differentiated instruction, operational modules, assessment, motor skills, pupils with visual impairments.*

JEL classification: I310, I260, Z2

Introduction

The process of achieving a high quality of the educational system for people with impairments aims all components of the instructional and educational activity: structure, content, organizing forms, methods, means, methodological orientations and the evaluation process. To achieve this, is necessary to have a balance between the educational process and the individual characteristics of visually impaired pupils. In this regard, the present research aims the utilization of a methodological

¹ National University of Physical Education and Sport in Bucharest, virgiltro@yahoo.com

² National University of Physical Education and Sport in Bucharest,
mujeaanamaria@yahoo.com

³ National University of Physical Education and Sport in Bucharest,
cristina_varzaru@hotmail.com



orientation – *differentiated instruction*, which involves organising the informational content in operational modules approachable by the motor level of visually impaired pupils.

“Differentiated instruction aims adapting the learning process to different possibilities of pupils, to their understanding capacity and their working rhythm, characteristics to some groups of pupils or even to each pupil.”⁴

“A differentiated classroom is, of necessity, pupils-centred. Pupils are the workers. The teacher coordinates time, space, materials and activities. Its effectiveness increases as pupils become more skilled at helping one another and themselves achieve group and individual goals.”⁵

The differences between individuals makes differentiated instruction a key condition in the efficiency of the educational process. It’s worth mentioning that not always, all pupils find the physical lesson attractive. What for some seems to be a novelty, for others can be a routine. Teacher’s role is to provide a favourable atmosphere for the education of each pupil, especially within the physical education lessons from the special educational units, where pupils presents heterogeneousness when speaking about individual particularities. Thus, a key element without whom differentiated instruction application wouldn’t be successful is represented by knowledge about individual particularities of each visually impaired pupil.

In both international and national literature, visual impairments include conditions as amblyopia (poor sight) and cecity (blindness). International Ophthalmology Council offered the definitions for terms used in the speciality literature. The term of poor sight is represented by small degrees of sight loss, when individuals can be helped by prescribing devices for visual help. The term of blindness designates total loss of sight, case in which individuals are forced to count on sight substitution abilities.

In our opinion, *visual impairment* is a sensorial deficiency whose activity leads to decrease or loss of vision, followed by morphological, functional, motor, psychological and social imbalances of individuals.

Grigore V., Solcanu M. (2009) identify a number of elements that lead to a lower level recorded for visually impaired pupils, including the inability to perform simple motor activities, with parts of their own body.

⁴ Marolicaru, M., (1986), *Tratarea diferențiată în educație fizică*, București, Editura Didactică și Pedagogică, p. 26

⁵ Tomlinson, C.A., (1999), *The differentiated classroom – Responding to the Needs of all Learners*, USA: Association for Supervision and Curriculum Development Alexandria, pp. 12 - 13



Therefore, inside of the educational process, physical education acts both on motor direction and on biological direction, through its contribution to improve motor capacities, social integration and physical development. Following these positive effects, physical education is successfully used in the educational process for visually impaired pupils. The intervention plan should be done with the starting point the mentioned disorders and the consequences appeared through its manifestation. In the educational process, formatting of motor skills represents one of the main goals of physical education and sports.

Knapp quoted by Horghidan V., Mitrache G., Tüdös Ş. (2001) define the skill as “the achieved capacity to reach determined results with maximum success and minimum of energy.”

Epuran quoted by Dragnea A. et al. (2006) affirm that motor skills are “characteristics of the learned motor acts, which through repetition acquire superior parameters of execution: coordination, accuracy, speed, ease, plasticity, automation.”

Therefore, the conducted experimental study will be focused on obtaining some relevant data regarding the operationalization of the above mentioned goal.

1. The purpose of the research

The purpose of the present research aims the optimization of the learning process of specific motor skills from athletics, gymnastics and basketball, of visually impaired pupils from 6th grade, through the use of differentiated instruction within the physical education lessons from the special educational units.

2. Hypothesis

Application of differentiated instruction through the use of operational modules for visually impaired pupils (amblyopia and blindness) from 6th grade can determine the optimization of learning process of specific motor skills of athletics, gymnastics and basketball.

3. Research methods

3.1. Objective

The main objective of the present research is formatting the specific motor skills of athletics, gymnastics and basketball for visually impaired pupils from 6th grade, enrolled in special educational units.

3.2. Methods

The research methods used in our research are represented by directed observation, experimental method and basic statistical indicators as mean, standard deviation and coefficient of variance, Wilcoxon Test, rate of progress and Mann-Whitney U Test.



3.3. Venue

Venue of experimental research was the Special Gymnasium School for Visually Impaired Pupils from Bucharest. At this school performed subjects with visually impairments.

3.4. Participants

The subjects (boys and girls) involved in this study are visually impaired pupils from the 6th grade. A number of 20 pupils, from which 10 characterized by amblyopia and 10 suffering of blindness were chosen. The experimental group consist in 14 pupils (9 with amblyopia and 5 with blindness). The control group is formed from 6 pupils (1 with amblyopia and 5 with blindness).

The most common ophthalmic diseases we can mention: retinopathy of maturity, disorganized globe, divergent strabismus, sequelae of retinopathy of prematurity, total retinal detachment, nystagmus, Stargardt's disease, glaucoma, hyperopic astigmatism, myopia with choroidal injuries.

In terms of chronological age, in most cases pupils match the year study in which they are enrolled, but there are also some pupils exceeding the age for the sixth grade.

Regarding the associated diseases we mention that two of the pupils from experimental group couldn't participate at the initial and final evaluation nor followed the differentiated instruction program.

3.5. Content of the research

The experimental activity was conducted under the physical education lessons from Special Secondary School for visually impaired, Bucharest. Physical education lessons had a stable feature, lasting for a period of 50 minutes.

At the beginning of the training period, an initial assessment was applied, which targeted the evaluation of the specific motor skills of athletics, gymnastics and basketball. We have used 10m Sprint test for athletics, Watershed, Bridge and Standing on shoulder blades tests for gymnastics and Multiple dribble with both hands, one at a time for basketball. (a equilateral triangle is marked on the ground with the side of 5m. Subjects execute multiple dribble with the skilful hand on the first side, than changes the hand for the second side, and for the third side, both hands will be used alternatively).

After applying the initial evaluation, we established visually impaired pupils' level in terms of motor skills. For both groups, the experimental group and the control group the same set of initial and final evaluation test are applied.



The experiment groups will benefit of the differentiated instruction application while the control groups will follow the traditional educational process from physical education lessons.

During the lessons, the experimental classes have worked on value groups resulted after applying the initial evaluation, related to one of the valences of differentiated instruction, this being the motor potential. For each test, assessment scales were conceived (see Table 1) and ranges of values, according to which, pupils of experimental group were divided into group value I and group value II.

Differentiated instruction was not applied according to pupils' gender, given the law number of boys/girls. Seconds, executions of isolated acrobatic elements and technique were transformed in grades, according to the assessment scale. Subsequently, using the range of values, value group were established from which each subject of the experimental group was a part. Value groups had the following values:

- Value group I: athletics (10–6 points), gymnastics (10–8 points), basketball (10 –8 points);
- Value group II: athletics (5–1 points), gymnastics (7–5 points), basketball (7–5 points);

Operational modules were consisting of 10 exercises for each specific motor skill, so for each value group. In total, the training program included a number of 60 means conceived according to the individual particularities of visually impaired pupils.

Table 1 Assessment scale

Athletics	Runnings	10m Sprint with up start (sec)	4.81- >5.00	4.61- 4.80	4.41- 4.60	4.21- 4.40	4.01- 4.20	3.81- 4.00	3.61- 3.80	3.41- 3.60	3.21- 3.40	<3- 3.20
Gymnastics	Acrobatics	Isolated acrobatic elements	1	1	1	2	2	2	3	3	3	3
Game	Basketball	Technique isolated skills	1	1	1	2	2	2	3	3	3	3

4. Results interpretation

Next tables (table 2, 3 and 4) include the interpretation of the obtained results by visually impaired pupils from experimental groups for initial and final evaluation, and table 5 presents analysis and interpretation of results obtained by pupils from control group at the final evaluation.



Table 2. Interpretation of results – athletic skills

TESTING	Mean	Differences (F-I)	Median	Standard deviation	Min	Max	Amplitude	Coefficient of variation
Initial	3.33	-0.33	3.19	0.56	2.59	4.30	1.71	16.8%
Final	3.00	(-9.8%)	2.90	0.50	2.29	3.92	1.63	16.5%
Range differences (Final-Initial)		N	Mean range	Sum range			Parameters tests	Result
Negative		12	6.50	78.00			Z	-3.062
Positive		0	0.00	0.00			P (2-tailed)	0.002
Equals		0	0.00	0.00			Effect size	0.63

According to Wilcoxon test, at 10m Sprint test, $p = 0.002 < 0.05$ for $z = -3.062$. Decrease of time with 0.33 sec (9.8%) from one testing to another is statistically significant. Data are dispersed relatively homogeneously around the mean for both testing. Mean value is 3.33 for initial testing and 3.00 for final testing. Effect size (0.63) shoes a very big difference between initial and final testing (see table 2). Chart results for both moments for the experimental group is presented in figure 1.

Figure 1. Results obtained at initial and final evaluation – athletics skills

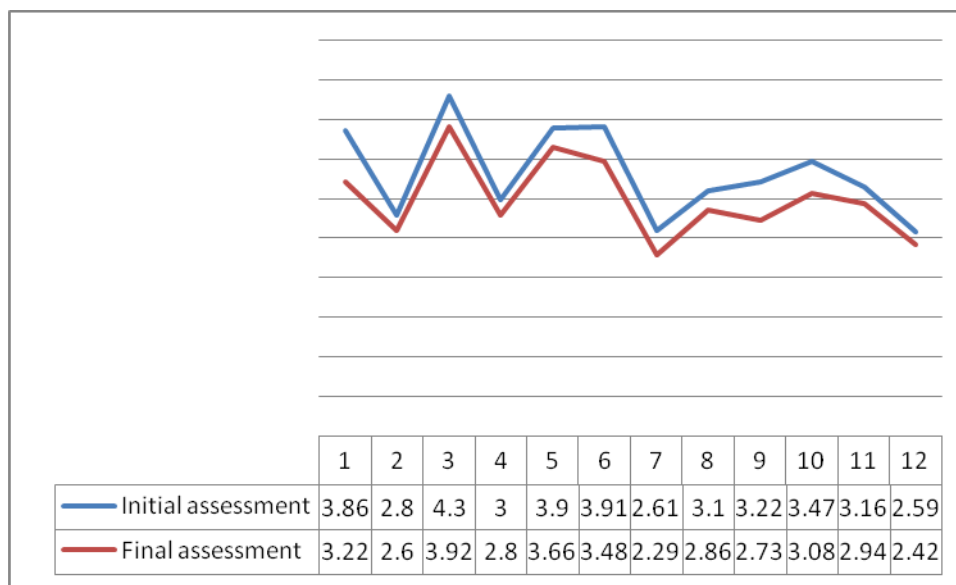


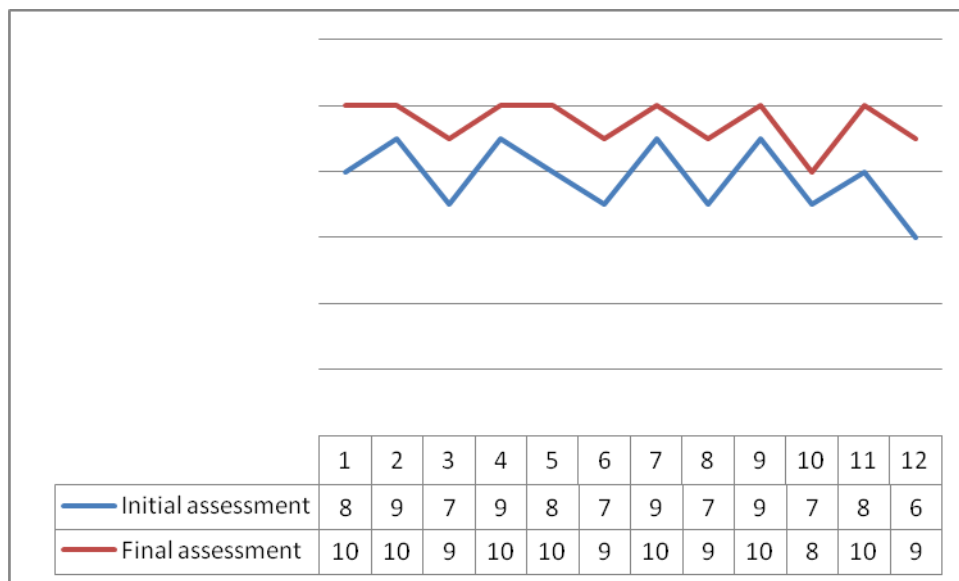


Table 3. Results obtained at gymnastics skills

TESTING	Mean	Differences (F-I)	Median	Standard deviation	Min	Max	Amplitude	Coefficient of variation
Initial	7.83	1.67	8.00	1.03	6	9	3	13.1%
Final	9.50	(21.3%)	10.00	0.67	8	10	2	7.1%
Range differences (Final-Initial)		N	Mean range	Sum range			Parameters tests	Result
Negative		0	0.00	0.00			Z	-3.126
Positive		12	6.50	78.00			P (2-tailed)	0.002
Equals		0	0.00	0.00			Effect size	0.64

Wilcoxon test, at gymnastics skills, $p = 0.002 < 0.05$ for $z = -3.126$. Increase of mean grade for gymnastics skills 1.67 (21.3%) from one testing to another is statistically significant. Data are dispersed relatively homogeneously around the mean for both testing. Mean values is 7.83 at initial testing and 9.50 at final testing. Effect size (0.64) shows a very big difference from the initial testing to final testing (see table 3). Chart results for both moments for the experimental group is presented in figure 2.

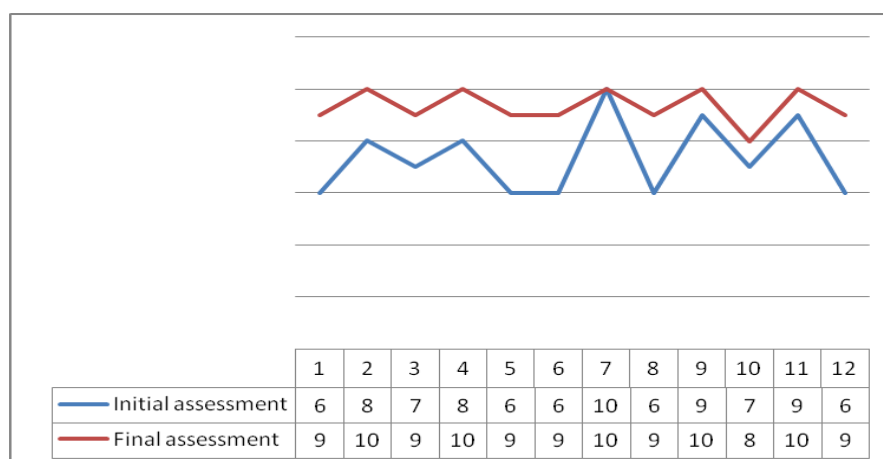
Figure 2. Results obtained at initial and final evaluation– gymnastics skills



**Table 4. Results obtained at basketball skills**

TESTING	Mean	Differences (F-I)	Median	Standard Deviation	Min	Max	Amplitude	Coefficient of variation
Initial	7.33	2.00	7.00	1.44	6	10	4	19.6%
Final	9.33	(27.3%)	9.00	0.65	8	10	2	7.0%
Range differences (Final-Initial)		N	Mean range	Sum range	Parameters tests		Result	
Negative		0	0.00	0.00	Z		-2.976	
Positive		11	6.00	66.00	P (2-tailed)		0.003	
Equals		1	0.00	0.00	Effect size		0.61	

At basketball skills, according to Wilcoxon test, $p = 0.003 < 0.05$ for $z = -2.976$. Increase of mean grade for basketball skills with 2.00 (27.3%) from one testing to another is statistically significant. Data are dispersed relatively homogeneously around the mean for initial testing and homogeneously at the final testing. Mean value is 7.33 at initial testing and 9.33 at final testing. Effect size (0.61) shows a very big difference from the initial testing to final testing (see table 4). Chart results for both moments for the experimental group is presented in figure 3.

Figure 3. Obtained results to initial and final evaluation – basketball skills

Regarding specific motor skills of athletics, gymnastics and basketball, pupils included in the experimental groups from 6th grade had a significant evolution, better than pupils from control group, Mann Whitney test (see table 5) confirming this difference (in all cases P value is lower than 0.05).



Table 5. Comparison of the progress rate– experimental group and control group

Skills	Athletics		Gymnastics		Basketball	
Progress (TF-TI)	-0.3	-0.4	1.7	1.0	2.0	1.0
Rate of progress %	-9.8%	-9.7%	21.3%	12.3%	27.3%	16.7%
Z (Mann-Whitney U test)	-2.275		-2.803		-2.359	
P	0.023		0.005		0.018	

5. Conclusions

After interpreting the obtained results, we can conclude the the hypothesis of the research is confirmed.

The main reasons for which it is recommended the application of the differentiated instruction in physical education lessons, are represented by facilitation of students' access to information, mobilization and motivation of pupils during the physical education lessons, the positive effects experienced in all directions. For example, something that is not understood cannot be learned, or something that doesn't motivate because is too simple or too hard. Some things are performed with an increased interest when it is observed by the executants that these things are followed also by practical applicability.

In the physical education lessons from special educational units, because of the heterogeneousness of the classes, application of differentiated instruction is imposed to be done according to the motor potential, aspect that will lead to undoubtable formatting of motor skills for visually impaired pupils.

Teachers will avoid the tendency of overprotecting the visually impaired pupils and will encourage the acquisition of autonomy and independence in the physical education lessons from special educational units.

BIBLIOGRAPHY

1. International Ophthalmology Council;
2. Dragnea, A., Bota, A., Stănescu, M., Teodorescu, S., Tudor, V., Șerbănoiu, S. (2006), *Educație fizică și sport – teorie și didactică*. Editura Fest, București;
3. Grigore, V., Solcanu M., (2009), *Rolul proceselor senzoriale în educarea capacităților coordinative la copiii cu deficiențe de vedere*, ANEFS, București;
4. Horghidan, V., Tüdös, Șt., Mitache, G., (2001), *Psihologia normală și patologică*, Editura Globus, București;
5. Marolicaru, M., (1986), *Tratarea diferențiată în educație fizică*, Editura Didactică și Pedagogică, București;
6. Tomlinson, C.A., (1999), *The differentiated classroom – Responding to the Needs of all Learners*, Association for Supervision and Curriculum Development Alexandria, USA.