

ABSTRACT OF THE DOCTORAL THESIS
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THESIS TITLE:

**OPTIONS FOR KINETOTHERAPEUTIC INTERVENTION THROUGH
LUDIC PROGRAMS FOR THE IMPROVEMENT OF DISORDERS
ENCOUNTERED IN PUPILS WITH MENTAL DEFICIENCY**

Key words: *motor activity; improvement; quality of life; mental deficiency; game; kinetotherapy; motricity; psychomotricity; virtual reality; disorder.*

The theme of the research *lies* in the area of advanced theory and practice in the field of „Sports Science and Physical Education”, through the elaboration and testing of an educational-therapeutic model, consisting of traditional motor games and virtual interactive motor games, in ludic programs, therefore valorizing new technical achievements and combining classical and modern methodology, with *a role* in enriching the theoretical and practical knowledge of the speciality.

The theme of the research is one of *actuality* and of *practical relevance*, meeting the requirements of the 21st century education, by implementing modern educational means and their use, along with the traditional ones, in the kinetotherapy activities with the pupils with mental deficiency, for the efficiency of the educational-therapeutic process.

The motivation for choosing the theme started from my experience gained in my capacity as a teacher of kinetotherapy in special education, from the desire to carry out a study through experimental ameliorative research, identifying and applying intervention options through ludic programs to improve motor and psychomotor impairments encountered in children with mental deficiency, introducing new elements of modern technology into the activity of kinetotherapy.

The thesis is decisively *interdisciplinary*, based on the premise that all fields of education are open and links can be established between different disciplines, in this case between: kinetotherapy; physical education and sport activities; sensory, motor and psychomotor education; ludotherapy, all reunited through the use of innovation, educational software (using a virtual environment), along with traditional means of education (using real objects). The implementation of the new information technology is a priority in the modernization of Romanian education.

The thesis is organised in three parts and 16 chapters.

Part I, Theoretical, conceptual and methodological bases of kinetherapeutic intervention through ludic programs for the improvement of the disorders encountered in pupils with mental deficiency, containing five chapters, is an introduction to the researched problem and includes the theoretical and empirical foundations of the problem, the current knowledge in the field, tendencies of applicability with positive educational-therapeutic influences.

Chapter 1, *Scientific Research Technology*, presents general aspects related to the premise, purpose, hypotheses, objectives and tasks of theoretical research, methods and techniques of research used.

Chapter 2, *Definitive, Methodological and Systematic Aspects of Mental Health. Legislative Provisions*, defines the concepts of *deficiency, disability, handicaps, children with special educational needs*, detailing the *legislative framework regarding the special education in Romania*. Then, it addresses issues related to *mental deficiency* (definition, history, classification) followed by presentation of *the particularities of intellectual development of pupils with mental deficiency*, ending with some *methodological suggestions* for the activity of kinetherapy with these pupils.

Chapter 3, *Psychomotricity, an area of intervention to alleviate disorders in children with mental deficiency*, processes the literature around the concepts of *movement, motricity and psychomotricity*. It also presents the *components of psychomotricity*, after that referring to *the stages of motor development at pre-school and school ages and at the stages of intellectual development of children*. Furthermore, this chapter refers to additional theoretical aspects regarding *psychomotricity disorders and psychomotricity education*.

Chapter 4, *Ludic Activity and its Importance in Educating the Child with Mental Deficiency*, introduces aspects that deal with the *philosophy of games, game seen as a cultural and social phenomenon*, then we mentioned *game typologies* according to various authors, then *functions and characteristics of games*, highlighting their educational character, and considering the presentation of some aspects of *modern techniques of using the game in children with special educational needs*.

Chapter 5, *Conclusions of theoretical research*, highlighted the need for the kinetherapy teacher to know the particularities of intellectual development of the mentally deficient pupil, both to promote methodological options for work with these children and to transform these options into educational and therapeutic objectives, using a variety of ludic activities to relieve motor and psychomotor disorders.

Part II, Findings and Possibilities of Relationship between Subjects - Kinetherapist-Parents, contains four chapters and includes preliminary research in which we have carried out an exploratory experiment for testing

the working tools, for improving the relationship between children, kinetherapists and parents, and to find ways for intervention in the education of motor and psychomotor disorders using new elements of modern technology.

Chapter 6, *Technology of Preliminary Scientific Research*, presents the premise, purpose, hypotheses, objectives and tasks of the preliminary research, as well as research methods and techniques.

The premise of this study is that we are in an opportune moment to use new kinetherapeutic intervention methods to relieve motor and psychomotor disorders encountered in mentally impaired children, through modern software and devices that, associated with traditional pedagogical methods, can be included in ludic programs with positive influences and in the relationships among children – kinetherapists – parents.

The aim of the preliminary research was to identify the characteristics of the relationship among children – kinetherapists – parents and to find ways of maintaining or improving these relations, while pursuing the diagnosis, identifying the manifestations of motor and psychomotor components in children with mental deficiency and developing a model of didactic project of ludic ameliorative intervention.

The preliminary research started from the following *hypotheses*:

- knowing as many aspects as possible of the life of the child with mental deficiency, certain characteristics of the quality of the child's life can be detached, with the surprise of the elements of relationship with the family and their pleasure to move, in the overall state of well-being;

- the motor and psychomotor development of children with mild and moderate mental deficiency presents delays but not at the same level for all evaluated components;

- children with mental deficiency are attracted, in playing, by modern technology devices used in ameliorative intervention programs.

For preliminary research, we have established the following *objectives*:

- to conducting a study identifying the existence of motor and psychomotor disorders in children with mental deficiency;

- to assessment of children's quality of life including elements related to the child's relationship with their family and their attitude to the movement;

- to identify and to use a variety of possibilities for relationship-building between children – kinetherapists – parents;

- to observe the interest in participation from the children with mental deficiency in kinetherapeutic activities, using virtual interactive game, in ludic programmes.

The research methods and techniques used have been established in accordance with the objectives of the preliminary research: the bibliographic study method, the pedagogical observation method, the conversation method, the registration method and technique, the exploration experiment method, the

statistical-mathematical method and the computerized graphic method and technique.

Chapter 7, *Considerations on the Relationship between Pupils with Mental Deficiency – Kinetotherapy Teacher – Parents*, presents some theoretical aspects of the preliminary research, with several authors' views on the types of relationships established between the three parties.

Chapter 8, *Organization and Conduct of Preliminary Research*, presents the *Organization of Preliminary Research*: the venue (Special Secondary School No. 8, Bucharest), the research stages and the tasks, the group of investigated subjects (consisting of five pupils with mild and moderate mental deficiency, from primary education) and the technology used (Kinect sensor, Xbox 360 console, laptop and apps, Xbox 360 video games, TV monitor).

In the *Preliminary research*, we had in mind the knowledge of the possibilities of the relationship between subjects - kinetotherapist - parents, in order to facilitate the kinetotherapeutic intervention through ludic programs for the improvement of the motor and psychomotor disorders encountered in the pupils with mild and moderate mental deficiency.

Measurement and evaluation were made by:

- psychomotor and motor tests: *Body scheme test, Spatial Orientation test, Temporal orientation test, Harris laterality test, Lower limbs coordination test, Tapping Ch. Walter test – testing manual dexterity, Long jump test – assessment of lower limbs explosive force, Trunk lift from dorsal decubitus position – evaluation of abdominal muscular force; Intersegmental coordination test (Bruininks - Oseretsky Test), Upper limbs coordination test (Bruininks - Oseretsky Test), Matorin Test, Bass Test – testing the dynamic balance, Dynamic balance test (Bruininks - Oseretsky Test), Static balance test (Bruininks - Oseretsky Test);*

-questionnaires: *AUQUEI – Pictured Child's Quality of Life Self Questionnaire, Play and Technology Questionnaire for children, Questionnaire on the subjects's opinion at the end of the virtual interactive game.*

For each motor/psychomotor component and for each questionnaire, the *Storage, processing, analysis and interpretation of the results* have been undertaken.

Regarding the *Kinetotherapeutic Didactic Design and Programming*, we presented the necessary conditions for the realization of a kinetotherapy program, and for the *Design and Didactic Programming Options*, we proposed a model of didactic project, with objectives, didactic methods, educational means and systems of educational-therapeutical action approach in a combined manner, traditional type and the computer-type, which anticipated the idea of the educational-therapeutic model conceived and applied in the experimental research.

Chapter 9, *Conclusions of Preliminary Research*, presents the arguments which confirm the hypotheses of the preliminary research.

The very good scores obtained in the domains *Family, Leisure and Functions*, from the *AUQUEI – Pictured Child’s Quality of Life Self Questionnaire* reveal that the investigated subjects, children with mental deficiency, are attached to their families, want to spend more time with the family, these children being in a boarding school weekly or semesterly basis; they like doing sports, all of which support the *confirmation of the first hypothesis of preliminary research*.

The results obtained in the applied tests revealed that, at the children with mental deficiency from the investigated group, there are delays in the motor and psychomotor development, but not at the same level for all evaluated components, which *confirms the second hypothesis of preliminary research*.

The answers given by the children to the questions from the *Play and Technology Questionnaire for children* and to the *Questionnaire on the subjects’s opinion at the end of the virtual interactive game* highlighted the fact that they are fascinated by TV, computer, mobile phones and are delighted with the introduction of modern means into their favorite activity – playing, thus *confirming the third hypothesis of preliminary research*.

In *the relationship between kinetherapy teacher – pupils with mental deficiency*, the subjects of the investigated group have shown attachment to the teacher, striving to respond to all requests and as best as possible, expecting intensely to reach the stage of deployment of the promised new game.

About *the relationship between parents – child with mental deficiency* we can say that all the children from the group of subjects love their parents and grandparents, brothers and sisters and want to spend more time in the family.

The relationship between kinetherapy teacher – parent of the child with mental deficiency was more difficult by the fact that parents of these children rarely come to school and have some reservations in communicating or collaborating.

From all of the above-mentioned findings, we conclude that *the hypotheses and the purpose of the preliminary research have been achieved*.

Part III, **The kinetherapeutic intervention through ludic programs in ameliorating mental deficiency disorders**, contains three chapters.

Chapter 10, *Experimental Research Technology for Verification and Improvement*, presents the premises, purpose, hypotheses, objectives and tasks of the experimental research, the methods and techniques of research used.

Among *the premises* from which we left to carry out the experimental research are:

-the game, a component part of motion therapy, can be used as a method of educational-therapeutic intervention to achieve progress in the sphere of motricity and psychomotricity;

-with the help of modern software and technological devices, the virtual interactive motor game can be included in ludic programs, alongside traditional motor game, in the kinetotherapeutic intervention, to improvement the motor and psychomotor disorders encountered in children with mental deficiency.

The purpose of experimental research was to develop, apply and establish the effectiveness of the educational-therapeutic model made up of ludic programs (using traditional motor games and virtual interactive motor games) in kinetotherapy activity, to improvement motor and psychomotor disorders in the child with mental deficiency.

The experimental research was designed around the following *hypotheses*:

-the use of ludic programs in the kinetotherapy activity amplifies the educational-therapeutic effects of amelioration of the motor and psychomotor disorders in the mentally deficient child;

-the educational-therapeutic model designed by us, consisting of traditional motor game and virtual interactive motor game, also representing means and methods of learning for these children, contributes to the improvement of motor and psychomotor disorders, with beneficial effects on children's quality of life;

-the virtual interactive motor game, as part of the modern technique, very attractive to children, adds more motivation in the participation of the mentally deficient child to the kinetotherapy activities.

For the experimental research, the following *objectives* were set:

-to identify and use a variety of possibilities for kinetotherapeutic intervention, using the game, to alleviate mental deficiency disorders;

-to create an educational-therapeutic model for improvement of motor and psychomotor disorders in the child with mild mental deficiency, a model made up of traditional motor games and virtual motor games;

-to observe the interest of participation of the child with mental deficiency in kinetotherapeutic activities, using virtual interactive motor game, in ludic programs.

The research methods and techniques used in the experimental research were the same as in the preliminary research, augmented by the pedagogical experimentation method.

Chapter 11, *Organizing and conducting experimental research*, presents *the Organization of Preliminary Research*: the venue (Special Secondary School No. 2, Bucharest), the research stages and the tasks (during the school year 2017-2018), the groups of subjects (the experimental group of ten pupils and the control group of ten pupils, all children with mild mental deficiency,

in primary education), logistics (a wide range of didactic materials required for traditional motor games and virtual interactive motor games).

Experimental research itself took place in three stages:

- *the initial test stage* at the beginning of the school year consisted of the application of motor and psychomotor tests in order to detect the disorders encountered in children with mental deficiency in both groups;

- *the intervention stage* consisted of carrying out during one school year some ludic kinetotherapy activities for the improvement of motor and psychomotor disorders encountered in the subjects from the experimental group, respectively the absence of such kinetotherapy activities in the control group;

- *the final test stage* at the end of the school year consisted of applying the same tests as initial testing to both groups (experimental and control). We note that in order to get feedback, the subjects of the experimental group received a questionnaire at the end of the last virtual interactive game that looked at the level of satisfaction with participating in activities that include virtual interactive motor games.

The kinetotherapeutic intervention was conducted with the subjects from the experimental group, according to a educational-therapeutic model developed by us, made up of traditional motor games and virtual interactive motor games in ludic programs for the amelioration of motor and psychomotor disorders encountered in these subjects with mild mental deficiency. A *global didactic design* was set up, with benchmarks and operational objectives, including a wide range of traditional and virtual interactive games for each operational objective. In order to make the kinetotherapeutic intervention more efficient, *didactic projects* containing ludic programs were devised.

The results obtained in the tests applied to the initial testing and final testing were stored, processed and interpreted, with intragroup comparisons and intergroup comparisons.

Chapter 12, *Conclusions of Experimental Research*, presents the arguments to confirm the hypotheses of experimental research.

In the initial testing, there was no statistically significant difference between the two groups' averages, meaning that the two groups left approximately the same level of acquisitions at the beginning of the experimental study; in the final testing, the situation changed, there being a significant difference between the averages of the two groups in most of the applied tests. These statistically significant differences are explained by the kinetotherapeutic intervention with ludic programs applied to the experimental group, the result being the amplification of the educational - therapeutic effects of improvement of the motor and psychomotor disorders in the child with mental deficiency, thus *confirming the first hypothesis of the experimental research*.

Through traditional motor games and virtual interactive motor games, elements of our educational-therapeutic model, the kinetotherapeutic intervention has had a major influence on the improvement of the motor and psychomotor disorders of the subjects in the experimental group, with beneficial effects on children's quality of life. For example, in *the Body scheme test*, the improvement in the experimental group was 28%, while in the control group was 7.04%; in *the lower limbs coordination*, there was an improvement of 37.63% for the experimental group and only 4.04% for the control group; in *the upper limbs coordination*, the improvement was 11.05% in the experimental group and 2.61% in the control group. In *the general coordination test (the Matorin Test)*, for the left, the improvement was 18.04% for the experimental group and 4.91% for the control group, and for the right, the improvement was 13.36% for the experimental group and 4% for the control group. Thus, *the second hypothesis of the experimental research was confirmed.*

After applying the questionnaire after the last virtual interactive game, the general level of satisfaction of the children regarding participation in virtual interactive games was very high (97.49%), *confirming the third hypothesis of the experimental research.*

From all the above-mentioned findings, we conclude that *the hypotheses and purpose of the experimental research have been achieved.*

Chapter 13, *Final Conclusions and Recommendations*, as the title suggests, presents the conclusions of this thesis.

The literature suggests that virtual interactive motor game has beneficial effects in improving the disorders encountered in children with special educational needs. In the present doctoral thesis, we have considered the use of both traditional motor game and newer, virtual interactive motor game in the kinetotherapy activity with the mentally deficient pupils, to increase the educational-therapeutic effect pursued by established objectives. The findings of the research suggest that results can be obtained in the improvement of motor and psychomotor disorders in children with mental deficiency, using an educational-therapeutic model, consisting of traditional motor game and virtual interactive motor game, in programs with a ludic character.

Recommendations: The results obtained in this research may be an incentive for specialists working with children with mental deficiency to engage more in the use of modern technology in the training-educational-rehabilitation process. To equip the kinetotherapy rooms with the equipment needed to carry out such activities using modern technology, teachers can participate in financing projects.

In Chapter 14, *Research Limits and New Research Directions*, we mentioned the following as the *limits* of research: In the virtual interactive game using the Kinect sensor, the audio information is not presented in Romanian, thus requiring the intervention of the teacher of kinetotherapy for

translation. Procurement of the necessary equipment for the virtual interactive motor games involves a financial effort from the teacher.

Taking into account the improvements achieved in the area of motricity and psychomotricity in children with mental deficiency by using the educational-therapeutical model made up of traditional motor games and virtual interactive motor games, a possibility emerges to extend by analogy and *in other directions of kinetotherapy from the special school*, for example in neurological disorders to increase coordination, control and balance.

Chapter 15, *Elements of novelty and originality*, presents the original contributions in the field of research approached:

- Investigating the possibilities and conditions for using virtual interactive motor games alongside traditional motor games in kinetotherapy activity in special education.
- Proposing an educational-therapeutic model, consisting of traditional motor game and virtual interactive motor game, which contributes to the improvement of motor and psychomotor disorders encountered in mentally deficient pupils, thus combining the established methodology with newer, modern, one.
- Selecting virtual interactive motor games to educate motricity and psychomotricity.
- Presenting a detailed analysis of the conditions imposed by a game in virtual reality, describing each virtual interactive motor game, used in the activity of kinetotherapy in special education.
- Designing and conducting a preliminary session on the participation of mentally deficient children in kinetotherapy activities in the special school, using virtual interactive motor game alongside the traditional type.
- Development of an experimental session to verify the effectiveness of the implementation of the educational-therapeutic model, conceived by us, in ludic programs for the improvement of the disorders encountered in the pupils with mental deficiency.
- Developing a questionnaire for achieving the satisfaction of children regarding participation in virtual interactive motor game in the activity of kinetotherapy in special education.

In Chapter 16, *Valorisation of scientific research activity*, we presented the scientific research activity carried out during the doctoral studies and capitalized through the publication of scientific papers in specialized journals and communications at conferences and scientific congresses.

The bibliography of the doctoral thesis contains 202 titles, including books and articles in printed and electronic format.

In a further volume there are *the Annexes* with methodologically representative documents.