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**ORIGAMI USED AS A CORRECTIVE-RECUPERATIVE METHOD
FOR CHILDREN WITH MENTAL DISABILITIES**

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Abstract

This article aims to present the results of an applied research in which origami technique has been used as a corrective-recuperative method in the process of training and education of children with mental disabilities. Through its peculiarities, origami technique can receive, depending on the context, but also on the teacher's skills, psychotherapeutic valences similar with ludotherapy, art-therapy, occupational therapy or ergotherapy. The research was conducted on a special category of subjects (children with mental disabilities from a special primary school), because we considered that this is the best period when they can acquire much more certain skills, abilities and capabilities so that to become able to realize the transfer of knowledge and to make connections, thus stimulating their rigid thinking. We emphasize that the success of such an approach is based on the fact that the technique should be applied systematically and methodically during several consecutive years. "Exercises" must be adjusted to the individual possibilities of children, because this training must be done in full cooperation with them in order to stimulate their self-confidence and thus to develop also their personality traits and behaviour. Basic assumptions of the research were: 1. the use of origami techniques in educating children with mental disability improves fine motor skills; 2. the use of origami techniques improves the level of mental functioning of the following processes: *inferior cognitive level* - perception (spatial view skills, development of forms perception), *higher cognitive level* - memory (increase storage capacity) and improves the capacity of concentration.

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Keywords: Origami; mental disability; corrective-recuperative method; education; personality traits.



1. Introduction

Over time, people have folded paper for different purposes such as for making religious offerings which were burned at Chinese Buddhist funerals or were hung in Japanese Shinto temples; as a method of packing gifts and money used by the upper classes of the samurai; as a recreational way to spend time with family; as a mean of developing patience, skill and artistic sense in kindergartens and schools; as a tool of educating the spatial view and forms perception for a better and easier understanding of the plane geometry and especially of the space geometry in schools, colleges and universities (Japan, Germany, United States, Israel); as ludotherapy, art-therapy, occupational therapy or ergotherapy for psychiatric patients or for patients with various sensory-motor disabilities (old people or people who suffered all sorts of accidents); as art!

The novelty of this research is that proposes the origami technique as a methodically and systematically way for cognitive and sensory-motor stimulation of children with mental disabilities, for at least one year of study of an optional curriculum, created for this purpose. Origami technique is seen in this study as a set of exercises meant to train, to correct and to improve the intellectual capacity of children with mental disability, to provide them the opportunity to gradually overcome some mental barriers. This study assumes theoretical and demonstrates practical that the optimal time to intervene with the aid of corrective-recuperative origami technique in the process of education of children with mental disability is the elementary school age. At this age, compensatory reserves of the body, based on a better plasticity of the central nervous system, lead to better results, sometimes amazing, the consolidation of confidence and self-esteem being beneficial for pupil adaptation to other disciplines workloads and also for correcting his school conduct.

2. Mental Disability - Theoretical Guidelines

Mental deficiency with all related issues: definition, terminology, diagnosis, etiology, legislation, sociology, therapeutic or psycho-pedagogical methods, remains extremely complex and often confusing or even contradictory. When we speak about the mental deficiency, not only the sphere of conceptual definitions is different from one author to another, from one area of activity to another (psychiatry, psychology, pedagogy, social security etc.), but also the terminology in which synonymy such as handicap, deficiency, disability does not bother as much as the terms that cause confusion (backwardness, delay, failure, weakness) and can induce the idea of possible return to normal. (Verza, 1998). Currently, terms such as "handicap" and "handicapped" is recommended to be replace by "disability" and "person with disability" in order to protect human dignity. (WHO, 2001).

2.1. Peculiarities of Psychical Process and Personality at the Children with Mental Disability

To use the most effective and appropriate means of education, correction and rehabilitation of children with mental disabilities is necessary to have detailed and profound knowledge about peculiarities of upper and lower cognitive mental processes and to identify the specifics of their personality, in order to act especially at those levels that can decisively contribute in the process of education and of socio-professional integration and to avoid items that may constitute vulnerabilities. In other words, it has to be identified "the strengths" and "the weaknesses" of the personality of each student. Of the many

characteristic aspects of mental deficiency, perhaps the most impressive aspect, by its vulnerability, is the emotional-affective structure, the fragility of personality construction and the infantilism behavioural. Teachers, who are working with such pupils, frequently face with their emotional lability, with their accentuated fear of making mistakes, with their infantilism and lack of motivation and with their lack of control behavior, often expressed through aggressiveness or violence.

Because the stated purpose of this paper refers only secondarily to the mental processes and personality characteristics of pupils with mental disabilities, we will not insist on them. We will remind only those concepts, constituted in true theoretical guidelines, which have guided us in using the origami technique to pupils with mental deficiency: *heterochrony* (Zazzo); *heterogeneity* (Piéron); *social incompetence* (Doll); *the fragility of personality construction and the behavioral infantilism* (Lewis & Fau) (Verza, 1998; Gherguț, 2007). To those peculiarities of mental processes and of personality of children with mental disabilities, synthesized in theoretical frameworks enshrined in literature, may be added many other constants from the concrete activities undertaken with pupils, including: *inability to concentrate his attention on the relative size of the surrounding stimuli* and *inability to secure or organize, in an effective manner, the elements of a work task*.

The key concept from which started the experimental part of this study was the one of the *sensorimotor intelligence* (Piaget, 1972), knowing that sensory-motor structures contribute to the development of cognitive functions and thinking. Therefore, intelligence arises from action, in its entirety, as transformers of objects and reality and the child work to assimilate knowledge is active and operative. To understand child development, in general, and children with mental disabilities, in particular, it is necessary to examine the evolution of perceptions, the perception being a particular case of sensory-motor activities.

3. Educational and Therapeutic Valences of Origami Art

In Europe, the German educator Friedrich Froebel (1782-1852), who founded the preschool child education in kindergartens, tried to introduce a number of origami models, who were a novelty and represented the most important part of the kindergartens curriculum, but without results. Remarkably, at that time, in Japan, origami was not studied by children from the state education system. The art of folding paper began to be used as an educational method in the Japanese kindergartens and primary schools, considering that: deepens the insight about the essential shape of an object, the objects being simplified to some defining characteristics and makes easier for children to understand geometry (Kobayashi, 2007). One of the pupils who benefited from this measure was Akira Yoshizawa, who, after the Second World War, became master of origami and contributed to its spread worldwide (Engal, 2010). Regarding the study of origami technique, Akira Yoshizawa together with the American Sam Randlett, created a conventional language of graphic representation for folding the origami shapes, which led to the spread and diversification of origami technique and brought origami on a high level of art (Jackson, 2009). In many worldwide schools, colleges and universities, origami was used for various purposes. Thus, in Germany, Bauhaus Academy of Architecture and Decorative Arts has included origami among courses for students; in U.S., mathematical studies combined with the I.T. techniques, allowed Robert Lang, a physicist, theorist and artist of origami to discover the mathematical algorithm that allow "computerized design" of an origami with multiple engineering applications (e.g. folded mirrors for

orbital stations, folded airbags) and in marketing and advertising (Lang, 2008); in Japan, the patience is tested by JAXA (Japanese Space Agency), to which one of the admission tests for candidates is to fold 1.000 paper cranes (*senbazuru*) (Roach, 2010). But the most comprehensive educational approach of using origami of outside Japan, it seems to be in Israel where, over 10.000 children from the public education system are studying geometry using origami. The link between origami and geometry is also suggested by the name of the discipline: *orimetry*.

In Romania, in the past, without knowing that it was named origami, in some kindergartens, children learned to fold paper in order to manufacture various items (salt shakers, glasses, helmets, frogs). The idea of Friedrich Froebel has been used especially in schools for disabled children, but it has been used sporadic, unsystematic, focusing more on the origami technique as a method of practical skills development, without knowing or without acknowledging about its complex of educational values. In the eighties, *Didactic and Pedagogical Publisher* has published a manual for special schools where, besides other activities, were presented a number of origami folds. Currently, in special education, origami is taught in the form of simple and sporadic activities, to the classes of training and development of practical skills. Through its peculiarities, origami is approaching to occupational therapy, but it is more attractive, more motivating, more challenging. Having a strong playful character, this technique incite: the child practices, memorizes and strives, playing! With each new test begins: to fold fairer and faster - *improving fine motor skills*; to memorize the folding stages - *improving storage capacity*; makes connections, comparisons. Without realizing it, begins to distinguish various types of paper - *developing sense of touch*, to match the colors more beautifully - *developing aesthetic sense*; to find new uses for the origami forms - *developing practical sense*. But, perhaps, the most valuable acquisition is that origami improves the perception of the shape and of the dimensions of objects; that, in time, pupils learn to differentiate the two-dimensional objects from the three-dimensional objects. For example, at the beginning, children make confusion between square and cube, between circle and sphere. After they repeatedly transformed squares of paper into cubes (*modular origami*) or spheres (*kusudama*), they no longer make this confusion (La Fosse, 2011). They also learn correctly the names of the geometrical figures: square, rectangle, triangle, circle, cube and sphere. In addition, through origami, while they are playing, they learn geometry elements: diagonal sides, angles; they learn to divide surfaces into halves and quarters and angles in halves.

If we want origami technique to be valued in all its educational and therapeutically aspects (art-therapy, ergotherapy, occupational therapy), corrective and recuperative aspects should be studied in a *Optional School Curriculum* (OSC), from curricular area of Technologies, adapted to the age and to the level of pupils with mental disability (Potolea et al., 2012).

4. Research Design

4.1. Purpose of Research

Short term: highlights the advantages of using the origami technique as a corrective-recuperative method in the education process of the primary school age children with mental disabilities.

Long term: expanding the use of the origami technique as a corrective-recuperative method to other years of study in the same school, in other special schools or in the mainstream education.

4.2. Objectives of Research

In the present research, there were targeted theoretical objectives and applicative objectives:

4.2.1 *The theoretical objectives* are organized into two basic directions aimed: 1. *the psychological perspective* – highlights the advantages of using technique as a corrective-recuperative method in the education process of primary school children with mental disabilities, and 2. *the socio-educational perspective* – identifies ways in which origami helps to increase the chances of socio-professional integration of pupils with mental deficiency, improving educational deficiencies, behavioral and emotional.

4.2.2. *The applicative objectives*, derived from the theoretical objectives were: 1. *the elaboration of an optional curriculum* for fourth grade dedicated to children with mental disability from special schools, named: “*Origami - We learn by playing*”; 2. *the elaboration of a method* to teaching origami technique to the children with mental deficiency; 3. *the creation of teaching materials* by using origami technique, materials that can be used in teaching origami, technological education, geometry or in logotherapy and psychotherapy cabinets

4.3. Research Hypotheses

Basic assumption of the research were: H1 - It is supposed that the usage of origami techniques in educating pupils with mental deficiency improves fine motor function; H2 - It is supposed that, the origami technique used in educating pupils with mental deficiency, contribute to the improvement of the functioning of the following psychological processes: *inferior cognitive level* - perception (skills development of spatial view and perception of forms), *higher cognitive level* - memory (increase storage capacity) and *attention* (improves the capacity of concentration).

4.4. Research Group

In order to do our applicative research, we have established a lot of 27 students (14 girls and 13 boys), aged between 10 and 12 years, from *Special Secondary School no. 8 - Bucharest*. The research was conducted over a school year, special education, where the class time is 45 minutes and origami technique is taught one hour a week. To better understand characteristics of the lot of students we have presented processing of data by gender and degree of mental deficiency results in next figure:

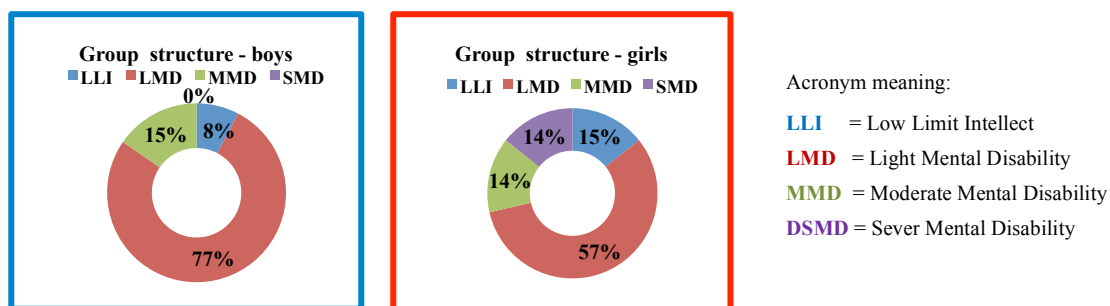


Fig.1. Structure of the lot according to the degree of mental disability and sex

4.5. Research Methods

The research was conducted in three distinct stages: initial, intermediate and final, each containing specific objectives.

In the initial stage there was targeted a initial evaluation of pupils with mental deficiency by applying a test for measuring their sensory-motor skills, spatial view and forms perception, ability to concentrate attention and the capacity of memorize. *In the middle stage* was realized a continuous assessment of pupils through direct observation and by analyzing their archived works at the end of each origami class, in their individual notebooks, so that it could be seen the time evolution of each of them embodied in their partial qualificatives. Their notebooks were transformed in *Portfolios*, modern and extremely useful tools in monitoring the progress of pupils. *In the final stage* was realized the final assessment by applying the same test administered at the initial stage.

Science the space of this study does not permit a detailed description of each step; we will refer just to the aspects of research that highlights the purpose and objectives of the fund's research, namely: *origami as a corrective-recuperative method with educational valences for elementary school age*. For the initial and final evaluation of the pupils, was performed a test inspired by origami technique in order to assess the degree of skill, the capacity to focus attention and to memorize the successive stages necessary for fulfilling the task. All indications were given oral and frontal, because some pupils cannot read, while some others really hard. In the envelope that they had received were four origami pieces and a paper with assembly instructions pictures. We will present the origami test and how it was applied.

- a. Each student received a form of evaluation test and 4 pieces of paper folded in origami technique:



Fig. 2. – Origami pieces that need to be combined

- b. On a piece taken as an example, it is shown to the students the jointing points as: pockets and spur:
 c. It is shown to all students (front) how to properly combine two parts:

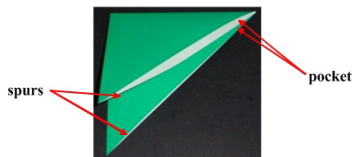


Fig. 3. – Specifying the jointing points: pockets and spurs



Fig. 4. – Proper way to combine two parts

- d. It is stated that they must respect the same sense of bonding:
 e. It is shown how to look the final work, achieved by assembling the 4 parts:



Fig. 5. – Example of assembling in one sense of the 4 pieces

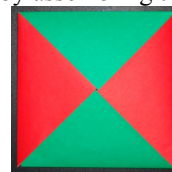


Fig. 6. – Final assembling

f. At the end of the test each pupil had to put the four pieces of paper (total or partial assembled) back in the envelope.

Working time was of 15 minutes and the score was calculated as follows: 10 points are granted by default, the rest of the score had to be achieved by the number of assembled parts according to the following scale: each piece used - 7.5 points; for each correct connection - 15 points; for each incorrect link - 7.5 points. In the following table have been mentioned all the variants of solving the test, taking into account: 1. the number of parts used by each student; 2. the number of the connections made, the correct one being dotted different from the incorrect one; 3. the set score from the correction scale.

Table 1. Establishing the scores according with the number of utilized pieces and number of realized links

Number of utilized pieces		Links				Acquired points	Total score	Qualifier
Number of pieces	Score	Correct links		Incorrect links				
		Number of links	Score	Number of links	Score			
0	0	0	0	0	0	0	10	IS
2	15	0	0	1	7,5	22,5	32,5	S
2	15	1	15	0	0	30	40	S
3	22,5	0	0	2	15	37,5	47,5	G
3	22,5	1	15	1	7,5	45	55	G
3	22,5	2	30	0	0	52,5	62,5	G
4	30	1	15	3	22,5	67,5	77,5	VG
4	30	2	30	2	15	75	85	VG
4	30	3	45	1	7,5	82,5	92,5	VG
4	30	4	60	0	0	90	100	VG

Taking into account that in the primary school are granted qualificatives, after processing data from the table above, it was specified rating based on the total score and there were established scores for the granting of qualifier, as follow: Insufficient (IS) - (0 ÷ 30); Sufficient (S) - (30 ÷ 45); Good (G) - (45 ÷ 70) and Very Good (VG) - (70 ÷ 100).

At this stage of research was conducted comparative analysis of data obtained by administering the same test at the beginning of the school year (initial evaluation) and the end of the school year (final evaluation) and interpretation of these data. The results achieved by the benchmark tests (initial and final) were processed and interpreted graphical using MS-Excel program.

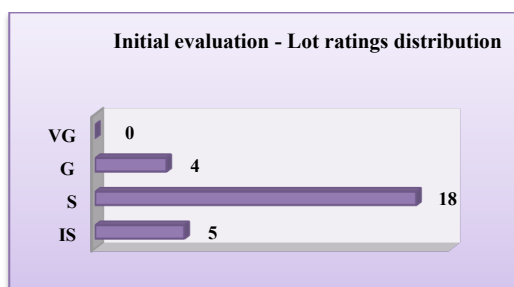


Fig. 7. – Initial evaluation – lot ratings distribution

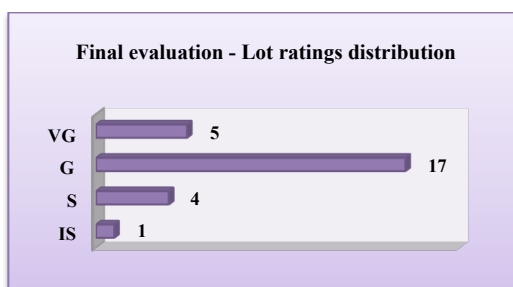


Fig. 8. – Final evaluation – lot ratings distribution

Looking at these two charts, we can say that the overall evolution of the pupils is obvious. If in the initial assessment, the majority of pupils was denoted by qualifier Sufficient (18 pupils), in the final assessment, the majority is denoted by the qualifier Good (17 pupils) - the small number of qualifier Good from the initial evaluation (4) equals the number of qualifier Sufficient from the final assessment (4). In the initial assessment not a single student was rated Very Good, but in the final evaluation 5 pupils have obtained this qualification. But the most impressive, given the degree of mental deficiency of the pupils, is the evolution of the Insufficient qualifier, which was obtained in the initial testing by five pupils, and in the final testing only by one pupil. The results of the final evaluation test indicate a positive overall assessment which emerges also from the pupils' notebooks (continuous assessment), from direct observation, but also from others teacher assessments. Due to the way it was designed the evaluation test, the final results indicates a positive evolution of fine motor skills, of the perceptual skills, of the ability to concentrate attention and of their capacity to memorize. Therefore, these results confirm those two hypotheses (H1 and H2). In addition to these positive results, the methodical practicing of origami technique led to: improve the working climate during class; improving the relationship between pupils; strengthening confidence and self-esteem to most of them. The findings of this research certify that origami becomes a corrective-recuperative method with rich educational valences in training and education of pupils with mental disability, with one condition: *to be practiced methodically and systematically*.

5. Conclusions

Through its peculiarities, origami technique can receive, depending on the context, but also on the teachers' skills, psychotherapeutic valences similar with ludotherapy, art therapy, occupational therapy or ergotherapy and moreover, can be used as a corrective-recuperative method in the process of training and education of children with mental disabilities from primary school. At the end of the research we concluded that this is the best period when they can acquire much more certain skills, abilities and capabilities so that to become able to realize the transfer of knowledge and to make connections, thus stimulating their rigid thinking. We emphasize that the success of such an approach is based on the fact that the technique should be applied systematically and methodically during a year of study, ideally over several consecutive years.

When we talk about pupils with mental disability, the method of teaching is very important and requires understanding of origami technique. If someone will use origami technique only as a mean of developing practical skills, will never reach to understand its complex therapeutic values. As noted, the technique should be used primarily as a mean of increasing the capacity of concentration, the capacity to memorize, the discipline of thinking and to improve pupil conduct. Only under these conditions, origami technique can improve fine motor skills and ultimately improves pupil's skills and practical skills (Toma et al, 2009). With improved life skills, child gains confidence, strengthens self-esteem and become more motivated and interested in the acquisition of new knowledge, new technical skills.

And we must not forget that all this things are happening while pupils are playing!

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