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THE ROLE OF THEORY MULTIPLE INTELLIGENCES IN PRIMARY EDUCATION PROCESS

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Abstract

Contemporary society imposes a pedagogy of diversity, so the current school must recognize the diversity of the human being and the interindividual differences. Precisely from this point of view, the instructive – educational process must be organized in such a way to adapt to diversity of students. As long as diversity is what characterizes the class of students, then it must also characterize the instructive - educational process with all that entails: diversity in topics covered, methods and techniques, materials used. One of the possibilities of differential treatment in class is the design of teaching-learning activities based on the Multiple Intelligence Theory (MIT) proposed by Howard Gardner. The Multiple Intelligence Theory allows for an interactive and differentiated instruction, supporting the development of student-centred learning that help the build their own resources, build their self-training capacities and develop their motivation for lifelong learning. The idea behind the individualization of the training is that there are individual differences between individuals about their cognitive structure, the learning and adaptation modes, the inner patterns that they use in learning. The purpose of this research was to implement and test an educational intervention program for 3rd class students in the development of multiple intelligences. As a result of the activities carried out in the program, improvements in the development of multiple intelligences: verbal-linguistic: M=3,78, logical-mathematical: M=3,78, bodily-kinesthetic: M=4,08, visual-spatial: M=4, musical: M=3,87, interpersonal: M=3,98, intrapersonal: M=3,88, naturalistic: M=4.

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1. Introduction

Traditionally the definition of intelligence is based on psychometry, this referring to the fact that the levels of intelligence can be identified with the help of the traits or set of traits presented in certain persons to a greater extent than in other. This type of approach has led to the occurrence of standardized intelligence tests, used in schools even today. The purposes of these tests are to identify and assess the traits/sets of traits so that the differences between the persons submitted to the tests to be described as measures of intelligence.

According to Pritchard (2008), Gardner's multiple intelligence theory stems mainly from the preoccupation that, when intelligence is measured, the most frequently used tests (the standard tests which measure mainly the linguistic and logical-mathematical capacities) often do not allow those tested to prove what field they excel at or in what fields their predominant intelligence resides. Thus, Gardner conceives a set of different intelligences that as individuals we show off more or less according to the particular intellectual component of each.

In addition, Gardner (1993) considers that intelligence is much more diverse and varied, demonstrating this through his work, namely that humans possess at least eight distinct, unique intelligences, defined by him as "the ability to solve problems or to create products that are important in a particular context or in a particular community" (p. 15). According to Gardner, the demonstration of the existence of a distinct intelligence can be achieved in several ways such as: experimental evidence, factor analysis, information processing demonstrations, determined basic activities, observable changes due to development, a history of evolution, deviations from normal development and studies on talent; these together constitute as evidence that supports the existence of multiple intelligences, which explains problem solving, the creation of new products and the discovery of new knowledge in eight spheres of culturally valued activity.

In his book "Multiple Intelligences and Learning Styles: Two Complementary Dimensions", Denig (2004) captures that intelligence is more than a score obtained on a typical standardized test and used to predict success in school, as such traditional intelligence tests do not measure the ability of an athlete or a master violinist. Gardner (1999) considers that these people, as well as many others, have intelligences that are not measured by these tests, so Gardner identifies eight distinct intelligences, as follows (see table 1):

Type of intelligence	Description	Related vocations
Linquistia	Sensitivity to spoken and written language: the	Writer lawyor post
Linguistic	ability to use language to achieve certain goals.	willer, lawyer, poet
	The ability to to analyze problems logically, carry	
Logical-mathematical	out mathematical operations, and	Mathematician, scientist
	investigate issues scientifically.	
Musical	Appreciation of musical patterns; the ability to	Musician composer
	compose and perform musical patterns.	Musician, composer
Bodily-Kinesthetic	The ability to use one's own body or parts of it	
	(eg, hands, feet) to solve problems or create	Dancer, athlete, craftsman
	products.	

 Table 1. Gardner's multiple intelligences (Harwood et al., 2010, p. 403)

Spatial	Ability to perceive spatial relationships and manipulate spatial patterns	Navigator, pilot, architect		
	manipulate spatial patterns.			
Naturalist	Ability to recognize and classify flora and fauna.	Biologist, naturalist		
Interpersonal	The ability to understand the desires and intentions of other people and to collaborate effectively with others.	Clinician, salesperson, politician.		
Intrapersonal	The ability to understand oneself and to use this understanding to make effective choices in life.	Relevant to almost any occupation or profession		

2. Problem Statement

Gardner (2004) mentioned two important advantages of multiple intelligence in education; these being:

1) offers the possibility to plan educational programs meant to make students want to participate;

2) allows us to reach more students who are trying to learn disciplines and theories. Learning would be very easy acquired if students were trained to use these types of intelligence (Bümen, 2004).

Stănculescu (2006) outlines the idea according to which at the level of the collective mentality the belief that school success, this summing up the linguistic and logical-mathematical performances, depends on the level of intelligence of the individual is deeply rooted. With this perspective, many psychologists were convinced that intelligence is really what the Standford-Binet scales measure, these containing sections that highlight the verbal and mathematical performances, so a strong selection was inevitably created: the students who had an ease to surprise the relationships between numbers, symbols, the realization of reasoning, the explanation of the meanings of some words proved to be the ones that successfully coped with the school curriculum.

In conducting his research, Gardner (1983) started from the following question: "Is intelligence reduced only to mental components involved in information processing and problem solving occurred in various contextual situations?", thus in an attempt to provide a relevant answer, he initially describes seven fundamental and relatively independent dimensions of intelligence, while bringing plausible arguments for the existence of multiple intelligences.

The researcher supported the idea that, although some people do not have extraordinary performance in the linguistic or logical-mathematical field, they can excel in other fields such as: spatial intelligence (artists, architects), interpersonal (psychological counsellors or empathetic teachers), music (performers and music composers) or kinaesthetic (athletes). Thus, concluding that there are people who, even if they do not excel in the use of intellectual endeavours, in certain situations may surpass those individuals considered more gifted than themselves.

Also, Stănculescu (2006) captures the step taken by Gardner from theory to practice, he is being dissatisfied only with a theoretical concretization related to the issue of multiple intelligence. Thus, Gardner proposes a new conception of school education: the design of a different assessment system than the one based on the use of standardized tests, namely the traditional one, out of the desire to allow the discovery and valorisation of each student's potential. The pedagogical system based on the multiple intelligence model works on the grounds that each student must be stimulated according to the skills he is endowed with.

A "personalized" school emphasizes a more complex and complete assessment of students' skills, competencies and aspirations, proposing new teaching techniques that are based on the strengths and cognitive profiles of each student. Pritchard (2008) notes that in planning lessons that focus on multiple intelligences, teachers should consider the range of activities appropriate to the content of the lesson and related to the expected outcomes, these providing a wide range of opportunities for children with different types of intelligences. This can be addressed by trying to answer certain questions such as:

1. *Logical-mathematical intelligence*: How could I include the use of numbers, classifications, critical thinking or calculations?

2. Linguistic intelligence: How could I include reading, writing or speaking?

3. Musical intelligence: How can I include music, sounds or rhythm?

4. Kinaesthetic Intelligence: How could I include movements, practical work, or dramatization?

5. Spatial intelligence: How can I include images, diagrams or graphics?

6. Interpersonal intelligence: How could I include group work, exchange of views or discussions?

7. *Intrapersonal intelligence*: How could I include individual work, individual learning time or choices?

Each lesson may not have adequate answers to all of the above questions, but over a period of time, the planning process would allow for a balanced approach to children's perceived needs.

Johnson and Kuntz (1997) conducted a study with participants as teachers who used the theory of multiple intelligences in the instructional-educational process. They found the following:

1. Multiple intelligences have been used as a basis for changing classes in a variety of ways: in planning, designing and teaching, teachers have reported that they have begun to introduce as many intelligences as possible in organizing educational activities so that teaching changes in order to respond to different student strengths. In terms of self-assessment, teachers were encouraged to identify their own strengths and dominant intelligences, and in terms of assessment this must be continuous and for the benefit of students, so that they become aware of their strengths.

2. Diversity in learning is appreciated: teachers have begun to realize that each student has different cognitive profiles, different strengths and intelligences and to begin to appreciate diversity in the classroom.

3. The climate in the classroom is more positive: students become more cooperative, starting to appreciate and respect the qualities of others.

Finally, Denig (2004) surprises that, although Gardner's theory does not have a strong research base, there is much popular support for the concept of "multiple intelligence". Some strengths of the theory in relation to the learning process are the following:

It serves as an impetus for reform in our schools, leading to a reassessment of those subjects commonly taught in school, with an increased emphasis on arts, nature, physical culture and other subjects traditionally limited to the periphery of the curriculum.

It is child-cantered and develops the innate potential of children, instead of forcing them to master foreign academic information.

Encourages children to grow and develop their potential as responsible human beings.

It challenges teachers to find different ways to make students learn a certain subject.

In the study carried out by Karamikabir (2012) he demonstrated the efficiency of using multiple intelligences in teaching mathematics especially in problem solving, because this process involves: discovery and reasoning (logical-mathematical intelligence), building a theory (intrapersonal intelligence and bodily-kinaesthetic intelligence), debating the cause (linguistic intelligence) and finding a harmony and a relationship between concepts (musical intelligence).

Success in the school, family, professional and social environment can be determined by both cognitive and emotional intelligence. Academic success and effective learning result from the effective use of both intellectual and emotional areas (Kizil, 2014).

Emotional intelligence and multiple intelligences not only complement each other in achieving success, but they interact with each other. Ozdemir-Yaylaci (2006) suggests that students need to build on their insight and use their feelings as effectively as possible, needing a rationalist brain to think as wisely as possible.

In addition to these issues, Ahmad et al. (2015) conducted research aimed at investigating motivation improvement among low-achieving students in history by integrating multiple intelligences into the teaching process of teachers. The results showed that the students in the experimental group acquired positive attitudes, respectively an increased level of academic motivation. Positive attitudes and increased academic motivation are two important variables in gaining students' interest in studying.

3. Research Questions

The question from which we started this research is the following: How effective is the use of multiple intelligences in the educational instructional process?

4. Purpose of the Study

The purpose of this research is to develop, implement and evaluate the effectiveness of an intervention program based on the development of multiple intelligences in the case of third grade students, focusing on the following objectives:

1. Assessment and identification of the level of multiple intelligences of the participants included in the study.

2. Elaboration and implementation of an intervention program based on activities for the development of multiple intelligences in order to optimize the instructive-educational process for third grade students.

3. Investigating the impact of the proposed intervention program on the development of multiple intelligences among third grade students.

5. Research Methods

5.1. Research hypothesis and variables

The hypothesis of this research is:

By implementing the intervention program "Accessibility and diversity" based on the development of some activities that develop multiple intelligences in third grade students, there will be significant changes in terms of optimizing the instructional-educational process.

Independent variable: intervention program

Dependent variable: the level of multiple intelligences

5.2. Participants

The participants in this study are 60 third grade students aged between 9 years and 6 months and 10 years and 2 months (Average age = 9 years and 7 months), students from "Regele Ferdinand" National Pedagogical College in Sighetu-Marmatiei, Maramures county.

Table 2. The distribution of participants included in the study

	Experimenta	l group	Control group		
Gender	Girls	18	Girls	17	
	Boys	12	Boys	13	

The participants of this research were divided into two groups: the experimental group made of 18 girls and 12 boys and the control group of 17 girls and 13 boys (see table 2).

5.3. Measures

Multiple Intelligences Test based on Howard Gardner's MI Model (Chislett & Chapman, 2005): This questionnaire measures multiple intelligences in the case of students between the ages of 8 and 16. It is composed of 40 items, 5 items for measuring each type of intelligence to which there were added 5 items for measuring the eighth intelligence, the naturalistic. Items are rated on a Likert scale from 1 to 5 where, 1 = never, and 5 = always.

Alpha reliability coefficients for the MIS subscales were as follows in one available study: Interpersonal ($\alpha = .75$), Intrapersonal ($\alpha = .50$), Linguistic ($\alpha = .65$), Logical-Mathematical ($\alpha = .67$), Spatial -Visual ($\alpha = .64$), Bodily-Kinaesthetic ($\alpha = .73$) and Musical ($\alpha = .79$) (Keaton & Bodie, 2012). In another study, the alpha coefficient was found to be .6862 (Thomas & Asnake, 2006).

5.4. Procedure

The research design is experimental, longitudinal study, because the research involves the application of an intervention program based on 10 activities that develop multiple intelligences in the case of third grade students, carried out over a period of 5 weeks.

In the *pre-test phase*, I focused on evaluating and establishing the level of emotional intelligence of the chosen sample of participants.

In the *experimental phase*, following the rating and interpretation of the answers, I developed an intervention program containing 10 activities, each activity will be performed in such a way as to develop as many intelligences as possible from the eight discovered by Gardner (1983).

These activities are carried out within four curricular areas considered to be more flexible and which allow the development of such activities, these being: Language and Communication, Mathematics and Natural Sciences, Man and Society and Arts, the subjects addressed being: Language and Literature Romanian, Natural Sciences, Visual Arts, Practical Skills and Civic Education. The methods/ strategies used in the activities are specific to the development of the 8 intelligences: conversation, explanation, problematization, demonstration, RAI technique, bunch method, pair / group work, individual work, role play/ mime, brainstorming, dramatization, storytelling based on pictures.

In the *post-test phase*, the participants included in the study were re-evaluated to see if there were any improvements in the development of multiple intelligences.

6. Findings

P	re emperimental ph	150			
	Group	Type of intelligence	Ν	MEAN (M)	STANDARD DEVIATION (AS)
		Linguistic Intelligence	30	M=2,42	SD=0,57
		Logical/Mathematical Intelligence	30	M=2,91	SD=0,55
		Bodily-Kinesthetic Intelligence	30	M=3,07	SD=0,61
		Spatial Intelligence	30	M=2,74	SD=0,60
	Experimental	Musical Intelligence	30	M=2,85	SD=0,87
	group	Interpersonal Intelligence	30	M=2,58	SD=0,56
	0	Intrapersonal Intelligence	30	M=2,94	SD=0,78
-		Naturalist Intelligence	30	M=2,55	SD=0,66
		Linguistic Intelligence	30	M=2,60	SD=0,51
		Logical/Mathematical Intelligence	30	M=3	SD=0,46
Pre-test		Bodily-Kinesthetic Intelligence	30	M=2,98	SD=0,74
phase		Spatial Intelligence	30	M=3,08	SD=0,8
		Musical Intelligence	30	M=2,90	SD=0,6
	Control group	Interpersonal Intelligence	30	M=3,10	SD=0,5
	BI	Intrapersonal Intelligence	30	M=3	SD=0,65
		Naturalist Intelligence	30	M=3,10	SD=0,67

 Table 3. Descriptive analysis of the multiple intelligences of the participants included in the study in the pre-experimental phase

In the pre-test stage, the results obtained (as shown in table 3) by the experimental group, consisting of a number of 30 students aged between 9 and 10 years old, prove to be lower than those obtained by the group of control, consisting of the same number of students.

Following the analysis of the results obtained by the two groups in the pre-test stage, they are remarked as the lowest grade point averages obtained in the case of linguistic intelligence in both groups, so we deduce that these students encounter some difficulties in both oral expression, but also in writing, composing texts, disinterest in reading, the consequences being various communication problems, a poor vocabulary, etc. In addition to the low grade point average obtained in linguistic intelligence by both groups, there is also the highest average obtained by the experimental group, in the case of corporalkinaesthetic intelligence, resulting in students being well coordinated physically, proficient in sports,

dancing and in terms of motor skills. In the case of the control group, the highest average is noted in interpersonal intelligence, telling us about these students that they are very sociable, they like teamwork and being surrounded by people.

	Group	Type of intelligence	Ν	MEAN (M)	STANDARD DEVIATION (AS)
		Linguistic Intelligence	30	M=2,60	SD=0,51
		Logical/Mathematical Intelligence	30	M=3	SD=0,46
		Bodily-Kinesthetic Intelligence	30	M=2,98	SD=0,74
		Spatial Intelligence	30	M=3,08	SD=0,8
	Control	Musical Intelligence	30	M=2,90	SD=0,6
	group	Interpersonal Intelligence	30	M=3,10	SD=0,5
_	Broah	Intrapersonal Intelligence	30	M=3	SD=0,65
		Naturalist Intelligence	30	M=3,10	SD=0,67
		Linguistic Intelligence	30	M=3,78	SD=0,54
		Logical/Mathematical Intelligence	30	M=3,8	SD=0,64
Post-test		Bodily-Kinesthetic Intelligence	30	M=4,10	SD=0,53
phase	Experimental group	Spatial Intelligence	30	M=4	SD=0,47
		Musical Intelligence	30	M=3,87	SD=0,66
		Interpersonal Intelligence	30	M=3,98	SD=0,57
		Intrapersonal Intelligence	30	M=3,91	SD=0,67
		Naturalist Intelligence	30	M=5	SD=0,7

Table 4. Descriptive analysis of the multiple intelligences of the participants included in the study in the post-experimental phase

Following the application of the intervention program, built of 10 activities focused on the development of multiple intelligences, there are improvements in terms of results in the post-test period, compared to those obtained in the pre-test period (see table 4). Thus, one notices, in the first place, an improvement of the grade point averages when it comes to linguistic intelligence. The students make proof of good oral and written communication, show interest in reading and taking part in the discussions/debate organized in the classroom. The highest grade point average obtained by these is 4.08 in the case of corporal kinaesthetic intelligence, the students having proved for the second time that they are very well coordinated from the physical point of view, in this sense contributing also an external factor which is the fact that the majority of them practice a sport/dance.

Table 5.	Paired	Samples	t test	Results
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	Pre	-test	Post	-test		95% CI for Mean Difference			
Outcome	М	SD	М	SD	n		t	df	d
Linguistic Intelligence	2.42	.57	3.78	.54	30	-1.70; -1.01	8.09^{*}	29	.66
Logical/Mathematical Intelligence	2.91	.55	3.8	.64	30	-1.11;57	6.44*	29	.83
Spatial Intelligence	2.74	.60	4	.47	30	-1.60; -1.02	9.26*	29	.58
Bodily-Kinesthetic	3.07	.61	4.10	.53	30	-1.34;72	6.73*	29	.80

Intelligence									
Musical Intelligence	2.85	.87	3.87	.66	30	-1.35;70	6.34*	29	.84
Interpersonal Intelligence	2.88	.56	3.98	.57	30	-1.65; -1.11	10.57^{*}	29	.50
Intrapersonal Intelligence	2.94	.78	3.91	.67	30	-1.32;57	5.20*	29	1
Naturalist Intelligence	2.55	.66	5	.70	30	-5; .17	2.03**	29	2.65

* p< 0.01, **p<0.05

Analyzing the results in table 5, there are statistically significant differences between the two pretest-post test conditions in terms of multiple intelligences. Therefore, following the calculation of the t test for paired samples, a: t (29) = 8.09, p = 0.00 was obtained for linguistic intelligence; a t (29) = 6.44, p = 0.00 for logical-mathematical intelligence; t (29) = 9.26, p = 0.00 for spatial intelligence; t (29) = 6.73, p = 0.00 for bodily-kinesthetic intelligence; t (29) = 6.34, p = 0.00 for musical intelligence; t (29) = 10.57, p = 0.00 for interpersonal intelligence; t (29) = 5.20, p = 0.00 for interpersonal intelligence and a t (29) = 2.03, p = 0.00 for naturalistic intelligence. Calculating the effect size for each pair, the strongest effect of the proposed intervention program was on: logical-mathematical intelligence (d = .83), musical intelligence (d = .84), interpersonal intelligence (d = 1) and naturalistic intelligence (d = 2.65). In conclusion, the hypothesis of the study is confirmed.

7. Conclusion

Out of the desire to demonstrate the applicability of this theory in school activities, but also the benefits it has on the way students acquire knowledge and the capacity of its understanding, I have designed an intervention program based on activities focused on the development of multiple intelligences in third grade children. The purpose of this paper was to develop, implement and evaluate the effectiveness of the intervention program based on the development of multiple intelligences in third grade students.

The activities of the intervention program were carried out during 5 weeks at the end of which the questionnaire was reapplied to both the experimental group and the control group. The results obtained in the post-test period proved to be significantly higher both compared to the results of the pre-test period and to the results of the control group. Thus, improvements were noted in terms of the development of multiple intelligences (linguistic intelligence): M = 3.78, logical-mathematical intelligence: M = 3.79, bodily-kinesthetic intelligence: M = 4.08, visual intelligence: M = 4, musical intelligence: M = 3.87, interpersonal intelligence: M = 3.98; intrapersonal intelligence: M = 3.88; naturalistic intelligence: M = 4).

The first limitation of this research is represented by the non-validation of the questionnaire on the Romanian population, which can lead to a margin of error regarding the results obtained by the students.

The second limit reveals the small number of participants, 60 in number. For the best possible results in terms of providing a real picture of the success of the intervention program, it is desired to apply it to a larger sample of students.

A future direction of research would be to develop students' metacognition by addressing the theory of multiple intelligences in order to design teaching activities.

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