Teachers for the Knowledge Society

Applying the Multiple Intelligences Theory into Pedagogical Practice. Lessons from the Romanian Primary Education System

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Abstract

Intelligence is largely viewed and accepted nowadays as modifiable and influenced by knowledge gained from various sources such as the personal experience or other systematic experiences. The person is born with a set of native abilities whose development is influenced by socio-educational factors. Education plays a significant role the identification, development and optimal utilization of the person's cognitive abilities within various educative contexts. Capitalizing on the multiple intelligences theory, we implemented our intervention on primary school students with learning difficulties. The study combines quantitative analysis with the qualitative insight based on a series of case studies.

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1. Introduction

The latest developments in education sciences made possible the re-evaluation of intelligence as a construct of educational psychology concurrently with the establishment of various paradigmatic positions.

From an ontological perspective (Herrnstein & Murray, 1996; Jensen, 1998; Miclea, 1999); we accept nowadays the modifiability of the intelligence, depending on various sets of acquisitions from personal experiences or from guided experiences immersed in educational contexts. Consequently, we accept today that the teaching-learning-assessment process significantly influences the development of intelligence. On the other hand, we accept that the individual is born with a set of genetically predisposed skills, which develop later in life depending on the social and educational influences. Accordingly, the intelligence does not evolve on its own; rather, it is "learned" as a result of various experiences, social, cultural, educational, and familial, of the human subject.

In the context of the theory of multiple intelligences, or TMI, we may argue that the person is born with an individual starting "profile" of his or her multiple intelligences or, in other words, the person is born with a certain level of development of these intelligences while the various experiences mentioned above may determine which of these intelligences develop and how much. As such, the teachers, professors, and educators, may play a significant role in the identification, development and optimization of the intelligences in formal, informal and nonformal educational contexts, with a view to optimize the teaching-learning-assessment process. Therefore, we hold central

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the consideration that a holistic approach to learning, a global perspective on the teaching-learning processes and a focus on differentiated instruction should be promoted, with a clear view on maximizing the learning in every student. In order to achieve such finality, we argue that the use of Gardner's multiple intelligences theory and the learning styles theory suggests valid ways of designing and selecting the specific approaches to learning.

In our approximation of the learner, we took into account three main interrelated characteristics:
1. The learning style or the combination of learning styles, as flexible, non-rigid, structures.
2. The thinking style.
3. The person-specific multiple intelligences.

The differentiated pedagogical activities are guided by the teacher's methodological perspective and by the educational objectives. The latter state the student's desired behaviors and cognitions, the educational context in which they will prove and experience these behaviors and cognitions and, implicitly, the more profound understanding of the curricular contents (Bocoş, 2002). Thus, the multiple intelligences theory becomes the foundation for an efficient achievement of educational objectives, by means of socio-pedagogical factors.

When teachers approach learning in the context of multiple intelligences, often times they arrive to the conclusion that a self-discovery initiative is very useful in relation with the different types of intelligences. The main characteristic brought forth by MIT in the learning process is the mobilization of the student's every skill during all stages of learning, while, as Goodnough (2001) states, the stimulation of all types of intelligences available by means of a well-poised tasks allocation will ease the learning process when dominant intelligences are used for solving the task and will stimulate the development of those intelligences "at risk" in the opposite scenario (Goodnough, 2001).

In other words, the working premise here it that it is very useful that the students are able to identify in their own set of abilities the type or types of intelligence in which they excel. Based on these premises, the creation of learning situations and of learning experiences which facilitate the identification of strengths and weaknesses in each person's multiple intelligences profile may prove useful in order to optimize the students-teacher interactions.

In a traditional schooling environment the students sit at their benches, listen to the professor's exposition, follow the demonstrations in the front of the class, while the professor asks questions to the class, formulates tasks for the students and waits for them to accomplish these tasks. In multiple intelligences theory-based class all of the above take place as well, but the variety of didactic influencing is much greater, and so is the diversity of curricular resources: singing of songs related to the taught content, organizing debates, drafting personal journals, compiling photographs collections, manual activities, puzzles solving, paintings, etc., which allow for diverse learning opportunities adapted to each student. More concise, the adaptation of the class according to the principles of multiple intelligences theory implies the creation of a series of pedagogical interrogations formulated specifically for each type of interrogation, in relation with the educational objective. For instance, in relation with the linguistic intelligence, we may ask orienting questions such as: "how am I/ are we going to use the spoken and the written words?"; in relation with the spatial intelligence "how am I /are we going to use the pictures, colors and/or images?", in relation with the interpersonal intelligence: "how am I / are we going to engage (the students) in shared or colaborative or group activities?".

The teaching-learning-assessment process viewed from the multiple intelligences theory's perspective refers to the optimal structuring of the teaching and learning environment based on the proper identification of the instruction context. Thus, in tasks allocated to students we take into account the dominant type of intelligence and we plan actions and/or activities that imply specific actions (McKenzie, 2005). For instance, for verbal intelligence we allocate tasks that target activities which imply writing, reading, speaking, asking, explaining, informing, communicating, reporting, articulating, addressing, allocating, narrating, lecturing, presenting, announcing, debating, reciting, describing, clarification, whilst for the logical-mathematical intelligence we take into account activities involving problem solving, asking, hypothesis formulation, theorization, examination, investigation, experimentation, analysis, deduction, argumentation, verification, determination, prediction, estimation, calculation, quantification, simplification, etc.

The educational strategies focus on comprehension and understanding and are oriented by two main guiding questions: "what to teach" and "how to organize the teaching process" in order to better adapt to the various individualities of the learners. Accordingly, within the multiple intelligences theory framework, we abide by the seven access points for introducing and constructing concepts: narrative, quantitative-numerical, logical, existential, esthetical, practical, and interpersonal. Gardner (1983) describes the way in which students use successfully their

dominant intelligence to assimilate the new concept according to their own thinking style, an approach we hold central in our study.

According to Gardner (1983) the assessment must also be adapted to the requirements of a MIT model; that is, the traditional assessment focuses only at verbal-linguistic and logical-mathematical types of intelligence while a more adequate approach should target also alternative assessment approaches, allowing the students to express and validate what they have learned in more than the two basic modalities. One of the factors which contributes to poor academic results is the strong saturation of the entire teaching-learning-assessment process with verbal-linguistic and logical-mathematical tasks (Gardner, 2006) .By encouraging the students to develop the entire range of capacities which eventually will decide their success and academic achievements, the school becomes also an important factor in teaching the abilities to perform in real life (Goleman, 2006).

2. The empirical investigation

2.1. Purpose of the study

The present study focuses on showing the influence of approaching the teaching-learning-assessment process from an MIT perspective on a group of primary school students with learning difficulties.

The action research methodology combines the inter-group design with a qualitative study to illustrate the effects of an intervention programme based on MIT (Bocoş, 2007). Thus, the independent variable of the study is the teaching-learning strategy, which differentiates between two comparison groups, one with traditional teaching-learning strategy and one tailored according to MIT.

2.2. Hypothesis

The working hypothesis was that a teaching and learning strategy adapted according to the theory of multiple intelligences are more efficient than the traditional teaching and learning methods, which lead to the formulation of the null hypothesis in the form that "there is no significant difference between the two groups of students when the traditional teaching and learning strategies are replaced with specifically MIT tailored strategies".

2.3. Research groups

We used two groups of students with learning difficulties, which were devised (N=36, divided into two groups of 18 individuals each, enrolled in the 3rd and 4th grade). The male-female ratio was 65.7% to 34.3% respectively, divided equally amongst the two groups. The dependent variable was the learning proficiency measured as academic scores in the Sciences discipline, for which two measurements were taken, one as pre-test measure and one as a post-test (post-intervention) measure.

The experimental group was subjected to a strategy of combined methods of teaching and learning specific to MIT. These students studied an optional matter, "Animal bodies", within the larger curricular area of "Mathematics and sciences". Throughout the study of this optional matter, the students were subjected to various inputs tailored for each type of intelligence.

The control group studied the same optional matter using the traditional approach, and was subjected to a frontal type of instruction, under normal learning circumstances and contexts.

2.4. Methodology

The research covered eight weeks of experimental study and followed the following procedure: first, an assessment test was applied, constituting the pre-test stage; the intervention programme for the experimental group was the second step, having the same curriculum for both groups; and third, the post-test stage followed, containing the final assessment testing, also identical for both groups.

The multiple intelligences were assessed by the teachers by means of a checklist (http://www.spannj.org/BasicRights/appendix_b.htm) and the initial and final tests were identical, as well as the

curriculum. During the first and third stages the students completed a 4 items learning situations perception questionnaire (1. the activities are interesting, 2. the activities are boring, 3. I am distracted during the activities, 4. I could have chosen another optional) which had the first item scored directly and the following three reversely scored. We devised this questionnaire ourselves, for the purposes of the present study, and based it on the central premise that the attractiveness of a certain study matter for the student influences the student' involvement in the tasks specific to that study matter.

2.5. Analysis of the results and statistical approaches

We chose to subject the data to a detailed analysis of variance (ANOVA) in order to perform a detailed quantitative analysis, by means of inferential statistics after which we have followed-up on the quantitative analysis with an in-depth qualitative analysis based on case studies.

Table 1. ANOVA results for the two variables

Variable	Group	N	Mean	Std. Deviation	F	Sig.
science pretest	experimental	18	6,1667	1,04319		
	control	18	5,8889	1,27827	,510	,480
	Total	36	6,0278	1,15847		
science posttest	experimental	18	7,3333	,72761		
	control	18	6,0833	,84453	22,633	,000
	Total	36	6,7083	1,00267		
perceptions pretest	experimental	18	6,6111	1,41998		
	control	18	6,2222	1,47750	,648	,426
	Total	36	6,4167	1,44173		
perceptions posttest	experimental	18	9,2778	1,36363		
	control	18	6,3889	,97853	53,327	,000
	Total	36	7,8333	1,87464		

Table 1 depicts the mean results (transformed in scores) for the two groups and reveals that the experimental group averages better results in the post-test stage in comparison with the control group. The table also shows that during the pre-test stage the academic results of the groups are statistically similar, while the results obtained in the post-test stage are significant, as confirmed by ANOVA ($F_{1,34}$ = 22.633, p<0.001).

The statistical analysis disproved the null hypothesis for p<0.001 and validated the specific hypothesis according to which the registered differences in academic performances are due to effects of applying our specific intervention, respectively teaching, learning and assessing according to MIT.

The analysis of the development of the perception of learning situations shows that in the pre-test stage there are also minor differences which become significant at the post-test measurement ($F_{1,34}$ = 53.327, p<0.001) which constitutes a significant bettering for the experimental group. This may be attributed to a better adequacy of MIT based learning activities for the students with learning difficulties (centered on the dominant type of intelligence), increased appeal for study and on the newly created possibility of better experiencing academic success than in the traditional teaching and learning approach.

We continued the quantitative analysis with a collection of case studies for the students involved in the control and the experimental group, with a view to obtain a more refined description of the changes which occurred during the eight weeks of tailored teaching and learning strategies. The results of the case studies collection confirmed and further nuanced the data obtained from the quantitative research. The case studies showed a common decreased interest in traditional schooling activities, a general deficit of motivation and many situations of differences between scores obtained by the students in verbal assessments as compared to other types of evaluations, such as visual-spatial tasks. It is worth mentioned that prior to the implementation of the action-research, the children included in the control group were classified as having learning difficulties such as disruptive behavior, skipping classes,

aggressive behavior and that significant discrepancies were identified in the results of the verbal scores as compared to performance scores after psychological testing, with the notable exception of the scores of those tests saturated with visual-spatial tasks. All case studies showed consistent improvement after the tailored strategies of teaching and learning. Moreover, the improvement of the children's school performances after the implementation of the intervention program may provide a valid explanation for the previously manifested lack of interest for the academic tasks, and their disruptive behaviors. The case studies analysis included a re-checking of these undesired behaviors and their corresponding frequencies and no significant difference registered after the implementaiion of the programme as compared to the control group.

3. Conclusions and discussions

The results of our study point out that an intervention programme based on teaching techniques derived from MIT lead to a significant improvement of academic results in students with learning difficulties, as well as to a more favorable view of the learning situations within the context of more differentiated learning. The MIT-derived strategies are brain-friendly (needs citations), and they are both adequate and efficient for those students with learning difficulties and underachievers. The minuses of such strategies are that they are more time consuming and more cumbersome to adapt and implement in a traditionally-oriented schooling system, but the very good results obtained after implementing the programme strongly recommend a more in-depth costs-benefits comparison analysis.

We are cautious about the limitations of the study, especially the limited power to generalize the results, given the small dimensions of the sample groups and the selection of the subjects. These types of researches require ampler studies, with randomized selection of the participants, in order to have a global significance. Moreover, longitudinal studies with a view to confirm the stability in time of the results are needed. Nevertheless, we are satisfied with the control of the independent variable and also with the manner in which the data that we have collected were scrutinized both with qualitative and quantitative analysis, which not only confirmed the logical assumption under the multiple intelligences theory but also showed statistically significant differences in academic results for children with learning difficulties after a tailored intervention programme.

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The theory of multiple intelligences proposes the differentiation of human intelligence into specific "modalities of intelligence", rather than defining intelligence as a single, general ability. The theory has been criticized by mainstream psychology for its lack of empirical evidence, and its dependence on subjective judgement. According to the theory, an intelligence 'modality' must fulfill eight criteria: potential for brain isolation by brain damage. place in evolutionary history. The Multiple Intelligences Theory states that it is to the benefit of both the student and the instructor if the student's intelligence can be identified. Identifying a student's intelligence allows the instructor to select appropriate activities for the student in the classroom and guide their learning journey more effectively. It allows us to apply meaning to words and express appreciation for complex phrases. Through reading, writing and sharing stories orally, we are able to marvel at our use of language. We see examples of this skill in journalists, poets, and public speakers. How to Use Multiple Intelligences in Teaching and Learning. While it is not possible to address all learning styles at once, utilizing a variety of project and lesson formats will help reach many more students. Schools known as Multiple Intelligence (MI) Schools are the schools that have adopted the pedagogy and curricular methodologies influenced by the Theory of Multiple Intelligences propounded by Dr. Howard Gardner, a Harvard educational psychologist. The ground breaking theory postulates that intelligence is not a monolithic ability but covers an entire spectrum of cognitive capacities termed "intelligences". There are at least 7 identified intelligences which include Logical Mathematical and Linguistic intelligences; Visual-Spatial intelligence, Bodily –Kinesthetic intelligence, Musical intelligence and Inter-personal, Intra-personal intelligence. Multiple Intelligences is a term which has first appeared in Howard Gardner's multiple intelligences theory. In conceptualizations such as Gardner's MIT theory of intelligence, people are freed from the static view which limits intelligence into a single aspect (Smith, Mark K. 2002). MIT Implications and frames in Language Teaching and learning. According to MIT theory , Language learning tasks can be developed around different types of intelligences. This is in great contrast to traditional education systems which typically place a strong emphasis on the development and use of verbal and mathematical intelligences. Thus, the Theory of Multiple Intelligences implies that educators should recognize and teach a broader range of talents and skills. Intelligence has been defined from a psychological, biological, physical, social, procedural and cultural point of view resulting in different definition each time. After almost eighty years from the first intelligence test made, Gardner (1983) in his book "Frames of Mind: The Theory of Multiple Intelligences" gives his definition of intelligence which gained and still gaining the favor of so many psychologists and educationalists. He defines intelligence as the ability to solve problems and to create valuable products in a cultural environment. Gardner is the first who talks about the plurality of intelligence. The theory of multiple intelligences (MIT, henceforth) represents a revolution against traditional approaches to intelligence which are based on the idea of uniqueness of intelligence.