

Teaching Mathematics for children with SEN – good practice examples

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ABSTRACT

The inclusion of children with special educational needs in the mainstream schools is a process that involves a lot of changes both at the structural level of education and at instructional level. Teaching Mathematics, no matter of the educational level, requires good competences regarding the planning, the development or the evaluation activities in the class. In this context, those teachers who succeed at making a good practice started with a best knowledge of their students and with a differentiated planning of those activities developed with the children with special educational needs. The main purpose of our study is to identify some good practice models of teaching Mathematics to children with special educational needs. We tried to identify what are the main educational strategies used by teachers in their activities in order to prevent or to fight against scholar failure of the children with special educational needs (SEN).

KEYWORDS: *disabilities, inclusive education, Mathematics, special educational needs (SEN), teaching.*

1. INTRODUCTION

Nowadays the issue of children with special educational needs (SEN) is of growing interest in many countries. The necessity of special teaching Mathematics to children with special educational needs (SEN) is revealed by the multiple researches in this domain. “Inclusive education is a complex and lengthy process which requires continuous analysis, adjustments and development, in order to achieve inclusive policies and practices starting with the early education. The principle of inclusive education was officially promoted in the U.S. in the early ‘90s with Individuals Disabilities Education Act” [1].

There are many publications which present studies on inclusive education. The researchers C. Forlin and D. Chambers asserted that: “the role of the generalist teacher is now affirmed as being an important component in the success or otherwise of inclusive education practice. Issues about the effectiveness of teacher preparation for working in inclusive classes have arisen” [2]. In another study, A. de Boer, S.J. Pijl and A. Minnaert said: “Teachers are seen as key persons to implement inclusive education. Positive attitudes are therefore argued as playing a considerable role in implementing this educational change successfully” [3]. U. Sharma, C. Forlin and T. Loreman, found that: “inclusion of students with disabilities into regular schools is now one of the most significant issues facing the education community both nationally and internationally. In order to address this issue there is widespread acceptance that teacher training institutions must ensure that new teachers are trained to teach effectively in classrooms where there are students with a variety of learning needs [4]. In a recent study, L. Bailey, A. Nomanbhoy and T. Tubpun showed that: “in Malaysia the views expressed by the teachers involved in inclusive education were positive towards the principle of inclusion. However, despite common

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professional development on special educational needs, these teachers lacked a common consensus about the benefits of inclusion; they expressed concern about the lack of teacher skills in this area; further professional development is required to address these shortcomings” [5]. In Romania there is a tradition of inclusive education [1].

The inclusion of children with special educational needs in the mainstream schools is a process that involves a lot of changes both at the structural level of education and at instructional level. Teaching Mathematics, no matter of the educational level, requires good competences regarding the planning, the development or the evaluation activities in the class. In this context, those teachers who succeed at making a good practice started with a best knowledge of their students and with a differentiated planning of those activities developed with the children with special educational needs.

2. METHODOLOGY

2.1. Purpose of Study

The main argument for this study is promoting the examples of good practice in order to help other teachers to prevent educational failure on children with special educational needs (SEN).

2.2. Sources of evidence

In our study we had two main categories of sources of evidence: legal documents and researches of teachers. For the first category, we tried to identify those European and national documents of educational policy regarding the educational activities developed for children with special educational needs (SEN): Resolution of the Council and the Ministers for Education meeting within the Council of 31 May 1990 concerning integration of children and young people with disabilities into ordinary systems of education; The Law of National Education (no 1, 2011); OMECTS 5573 and 5574/ 2011. The second category included 28 researches of teachers which worked with children with special educational needs (SEN).

Those researches were made in three counties of Romania (Brasov – 8 localities), Covasna (2 localities) and Alba (1 locality), on 73 pupils on different levels of education (preschool, primary, secondary and high-school level).

2.3. Methods and instruments

The researches included methods as: observation (as well in the period dedicated to getting the students known, as in the realization of case studies and of personalized intervention plans for children with special educational needs), colloquy, the analysis of the pupils’ educational products, experiments, study of documents (catalogues, students’ transcripts, students’ psycho-pedagogical data sheets, students’ personal files, different documents from the school archive referring to some aspects of the students’ training – scholar curriculum). It was also used SWOT analysis in order to identify the main strengths and difficulties in learning Mathematics.

Within the issue of planning and developing the learning activity and the students’ individuality study, the docimologic test has become a core instrument.

The sociometric test has been applied in the period dedicated to getting the students known, achieving as well the common matrix for election and rejection.

2.4. Period

The researches developed between 2006 and 2012.

3. FINDINGS

Using the SWOT analysis, the results revealed that the main difficulties presented are dyscalculia, difficulties of understanding the meaning of numbers or of mathematical operations.

Examples of other difficulties in mathematics for primary school: there are confusions between the triangle and rectangle or between the inside and outside of a geometrical figure; during the transition from oral calculation (in which the numbers to be added up or subtracted are written in line) to written calculation, the students do not arrange correctly the terms/factors in order to perform that operation; students make mistakes at the algorithm of calculation of the unknown term; students make mistakes at the composing and decomposing of natural numbers, in the recognition of tens digit and the units digit; students do not know the neighbours of even and odd numbers; students do not command the correct ordering of numbers from least to greatest; frequent errors occur at the exercises of addition and subtraction with crossing tens barrier; the months of seasons or the own date of birth are not known etc.; there are difficulties in associating the terminology higher, lower, with the corresponding operation; the data of the problem is not being consciously read or analyzed and therefore it is not correctly solved; the assignment of the exercise is not carefully read and therefore its requirement is being confused; mistakes occur in identifying the first factor of multiplication and in writing the products; the expression: “with....more” is confused with „by... times higher”; mistakes occur in identifying the factors when the product is known; difficulties arise at transposing the problem’s statement into exercise; the association between the name and operation (product, addition, subtraction, ratio) is not correctly made; due to inattentive reading of the statement, there are common mistakes at dual -choice items; difficulties arise at using the signs $<$, $>$, $=$ in simple inequalities; mistakes occur in enunciating a problem according to a literal formula.

We hereinafter present the united results of the researches made upon the issue of teaching and learning Mathematics to classes with integrated special needs students. A thorough knowledge of each pupil, accompanied by determining the level of mathematical knowledge and the deficiencies level in the preparation of each student were basic conditions to achieve progress in math. Through differentiation and individualization, the quality of learning mathematics has increased significantly. Only working differentiated and individualized within the students' questions, the group- or independent -work tasks (on notebooks, fiches, blackboard), within the practical activity , or homework, most pupils became aware and improved their results.

For the children with special educational needs the focus has been on recognizing information in order to help them achieve the syllabus objectives at a minimal level. Getting satisfaction in fulfilling the tasks increased their self-confidence. Individual treatment was needed to promote the optimal development of skills and abilities of each student.

In the case of children with special educational needs the individualised learning had a massive role, although the children in discussion were separated from the other children, and this fact has increased their own isolation tendency. It has been called on their integration with other students in solving tasks at the extent of their powers, invoking the general human desire to help. As a consequence, many students offered to help, and their help was accepted.

Besides the differentiated and individualized teaching, a progress of these children was noticed, when the teachers were using interactive methods in the educational practice.

For the students under the lower limit of mathematical performance standard were assigned additional hours, organised on level groups in order to help them make progress.

Another didactic strategy successfully applied for children with special educational needs during the Mathematics class, was the use of educational software, created in order to improve the typical, general mistakes.

The majority of the children with special educational needs didn't read attentively the text of the problem, which led to making random operations with numbers. That is why it was insisted upon going over the stages of math-problem solving with more attention.

Following the completion of these experiments, in which were taken the ameliorative measures mentioned above, it have been noted light progresses in math for children with special educational needs, such as: numeracy knowledge in the 0-10 concentre, comparing natural numbers and composing and decomposing them in the same concentre, ascending / descending ordering in the 0-10 concentre, addition and subtraction with support, without crossing the order in the 0-100 concentre, and even the addition and subtraction with and without crossing the order in the 0-1000 concentre.

4. CONCLUSIONS

The conducted study has led to the following conclusions. The indispensable premises for ensuring some progress in Mathematics for every child with SEN are: differentiated and individualized teaching, differentiated recommendation of the homework, use of group interactive methods, of independent work, of recover fiches, allocation of overtime work with these children, use of educational software, solving practical problems and problems of immediate recognition and application, of the learned theory.

Another conclusion with practical implications for teachers is that pupils' interest in Mathematics is determined by the way in which the teaching, learning and assessment of mathematical knowledge are done. Involving pupils in extra-curricular activities is likely to stimulate interest in Mathematics.

To determine students to love Math, depends on who is teaching it, on the whole teaching strategy used, on the skill, dedication and ability with which teachers work.

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