MULTILINGUAL ACADEMIC JOURNAL OF EDUCATION AND SOCIAL SCIENCES
www.kwpublications.com
ISSN: 2308-0876

# Teaching Mathematics in Inclusion Units of Primary Schools in Greece: Educational Perspectives

Evangelia Boutskou

**To Link this Article:** http://dx.doi.org/10.6007/MAJESS/v2-i1/1020 DOI: 10.6007/MAJESS/v2-i1/1020

***Received:*** *02 January 2014,* ***Revised****: 04 February 2014,* ***Accepted:*** *20 March 2014*

**Published Online:** 19 April 2014

**In-Text Citation:** (Boutskou, 2014)
**To Cite this Article:** Boutskou, E. (2014). Teaching mathematics in Inclusion Units of primary schools in Greece: Educational perspectives. *Multilingual Academic Journal of Education and Social Sciences*, *2*(1), 58–69.



**Vol. 2, No. 1, 2014, Pg. 58 – 69**

https://kwpublications.com/journals/journaldetail/MAJESS **JOURNAL HOMEPAGE**

MULTILINGUAL ACADEMIC JOURNAL OF EDUCATION AND SOCIAL SCIENCES
www.kwpublications.com
ISSN: 2308-0876

# Teaching Mathematics in Inclusion Units of Primary Schools in Greece: Educational Perspectives

Evangelia Boutskou
School of Education, Aristotle University of Thessaloniki

**Abstract**
The way Inclusion Unit teachers work in Greece does not depend only on their informed decisions about students' needs but on structural and organizational issues as well. The aim of this study was to explore how Inclusion Unit teachers organize students' groups during mathematics teaching. We tried to identify which students are taught mathematics in Inclusion Units, what are taught and how. Twenty teachers who worked at twenty Inclusion Units from different socio-economic areas of a big city in northern Greece were interviewed using semi structured open ended questions. The qualitative analysis revealed that students' needs as well as teacher's time and organizational issues were important factors that influenced mathematics teaching. The findings of this study highlight the need for school changes and reforms.
**Keywords**: Inclusion, Mathematics, Special Education, Inclusion Units.

## Introduction

Although there is a collection of many individual successful stories of special education instructions (Abbott et al, 1999) meta-analytic research revealed only small or even negative effects associated with learning outcomes of students participating in special education (Cook et al, 2003). Special education research has focused on evaluating children's characteristics and describing their educational achievement (Yang et al, 2005; Gersten et al, 2000). Plake (2008) has questioned the wisdom of standard testing and has suggested the development of alternative performance level descriptors with major consequences for students, teachers, curricula and educational policy (Elliott, et al, 2008).

Teaching mathematics in the field of special education is an issue that has been researched in an "inward" perspective examining students' learning of distinct special educational needs. Researchers have sought for the most effective method for children with similar needs or with similar difficulties. They have tried to identify evidence- based interventions and instructional procedures that could be implemented with specific groups of students as distinct categories of learners (Burns & Ysseldyke, 2009). This is a Bottom-Up perspective based heavily on behaviorism which places emphasis on individual needs. Controversies over what to teach (curricula) and how to teach (instruction) are at the core of the "math wars" and are analogous to phonics vs whole word reading debate (Kelley et al, 2008). According to Burns (2005) explicit teacher centered instruction based on factual and strategic knowledge limits the conceptual thinking of students. The resulting belief is that teachers should let students discover mathematics problems and invent their solutions. Instructional materials should be everyday items such as paper clips, blocks, calculators rather than textbooks, worksheets and pencils. Opponents of the student-centered approach value the explicit and specific skill instruction and they support the implementation of teacher centered techniques with clear teaching objectives and specific instructional sequence (Fuchs et al, 2002; Hudson & Miller, 2006). Explicit teaching on algorithm is thought to be necessary and learning basic/prior knowledge is seen as a prerequisite for solving more complex problems (Howell & Nolet, 2000).

However teaching and learning in classrooms do not happen in a neutral sphere but within a context that influences both teaching and learning (Weinner, 1992). This is a Top- Down perspective based on constructivism which places individuals within specific contexts. Teaching is considered not as the outcome of informed decisions about children's needs fulfillment but depends on various structural factors as well (Malouf, 2005). How mathematics is taught in Inclusion Units in Greece does not depend only on students' needs and teachers' will but on organizational issues as well.

The aim of the study is to follow an "outward" perspective and explore mathematics teaching in Inclusion Units in primary schools in Greece. Our aim is to identify which students are taught mathematics in Inclusion Units, how they are taught and what they are taught. Our effort is not to reveal the different instructional procedures or interventions teachers use but to identify how teachers organize their study groups.

**Setting the Scene**

Inclusion Units were established in Greek schools in 2000 and replaced the former Special Classes where students withdrew for some intensive instruction. According to educational legislation each child can attend the neighborhood school no matter what type of difficulty s/he has. However each school does not have an Inclusion Unit. Schools can establish an Inclusion Unit as long as there are registered students with a statement -diagnosis and they ask for a Special Education teacher.

Teachers who work at Inclusion Units are mainstream teachers with some extra qualifications in special education. They usually hold a diploma in Special Education and few have a Masters or a PhD in the field. Their teaching hours vary between 20-24 hours per week depending on their teaching experience; the newly appointed teachers teach 24 hours while the oldest colleagues teach 20 hours. There is only one Inclusion teacher appointed for one School. Fifty percent of the total population of students who attend the Inclusion Units are children with learning difficulties (Zoniou-Sideri, 2005). The other 50% of children have various disabilities. Students usually attend the mainstream class and they withdraw to the Inclusion Unit every day for one or more hours but they cannot exceed their attendance of 15 hours per week. While the students are at the Inclusion Unit their classmates follow their timetable. The way Inclusion Units function in the Greek educational system has not been discussed in the literature and this study gives us the opportunity to reveal some every day practices that can update the dialogue about necessary school reforms.

## Method

Twenty teachers who worked at 20 Inclusion Units from different socio-economic areas in the city of Thessaloniki at the northern part of Greece were chosen randomly and interviewed using semi structured open ended questions. The interviews took place in the Inclusion Units and lasted from 30-50 minutes each one. They were tape-recorded and transcribed. The analysis of their responses was based on Grounded theory and the constant comparative method (Strauss & Corbin, 1990). Data was sorted into various categories trying to find similarities and differences with open coding. Then the properties of the categories were dimensionalised. Following axial coding the data was put back in new ways in terms of conditions, context, interactional strategies and consequences of these strategies in order to enhance theoretical sensitivity. As a third basic step of the procedure, selective coding was used in order to choose a core category and integrate the other categories in an analytic way. The analysis of the interviews stopped when we reached the "saturation point". Journal notes of the interviewer as well as lists of registered students and teachers' timetables were used as a way of triangulating the data.

One limitation of the study is the relative limited number of teachers' sample. However, this study is a "snapshot" of how Inclusion Unit teachers teach mathematics at the particular time and place. This study makes implications for future research and highlights the need to discuss with practitioners in order to implement changes at schools. Another limitation might be the self-reported nature of answers which presents the possibility of receiving socially and educationally desirable answers. In order to reduce this possibility we used as a part of the triangulation procedure the Inclusion Unit timetable and the list of registered students so that we were able to cross check teachers' answers. It might be interesting to replicate this study after some years and to examine whether there are any changes in teaching mathematics in Inclusion Units. Future research could also incorporate observational techniques as well.

## Results & Discussion

### Who is taught: The profile of students taught mathematics in Inclusion Units & Assessment Implications

Twenty Inclusion Units took part in the study where 180 students from Grade 1 to Grade 6 were registered. Almost half of the registered students (92 out of 180) attended mathematics at the Inclusion Unit. Only half of them (40 out of 92) had statements mentioning some difficulty in mathematics. It is interesting the fact that from the 92 children who attended mathematics at Inclusion Unit the ratio between male to female students is almost 1:1 and not 4:1 that is reported in the international bibliography.

***Table 1.*** *Number of students attending mathematics in Inclusion Units with and without statements*

| Total Number of students attending the Inclusion Units | |
|---|---|
| 180 | |
| Total Number of students attending mathematics in Inclusion Units | |
| 92 | |
| Statements with reference to mathematics | Statements without reference to mathematics |
| 40 | 52 |

Half of the students who attended mathematics in Inclusion Units had statements that did not mention anything about difficulties in mathematics. This fact reveals that teachers and the committees of the diagnosis centers have different views. At this point dual interpretations could be made. On one hand someone could deduce that the committees of the diagnosis centers are right and teachers withdraw students from their mainstream class that should not. Teachers may overuse students' withdrawal at Inclusion Unit for various reasons and interests. On the other hand someone could deduce that teachers are right because some diagnostic centers may not use assessments in mathematics and thus statements do not mention difficulties in mathematics.

Teachers of the study reported that statements from different public diagnosis centers did not make any reference to mathematic skills:

*"There is not a single diagnosis mentioning difficulties in mathematics. However half of the children (who have a statement and were advised to attend an Inclusion Unit) have difficulties in mathematics"*

The reasons why difficulties in mathematics escape from statementing procedure reported by teachers are: a) the limited time of assessment procedure and b) the different level of perceived necessity between literacy and numeracy.

*"The statements, almost all of them did not say anything about mathematics. Probably the children were not examined or assessed in mathematics. I worked for two years at a Center for Diagnosis and when I made the child's assessment, I put an emphasis on the literacy and not on mathematics. It is the same as with other different status subjects. For example, we say that the Religion subject is less important than literacy. It is the same for the mathematics subject compared to reading. Since literacy is the most functional part of communication thus we assessed only literacy and we did not examine mathematics"*

Teachers do not feel that the statements help them in their work. When statements mention difficulties in mathematics they make a general, vague comment on mathematics.

*"Some statements make a short comment about mathematics. For example they say that the child has difficulties in mathematics and nothing more. The statements just confine to the label, to give the child a label and nothing else"*

*"Statements say that the child has Down syndrome or that the child has mental retardation. They do not explain anything about mathematics"*

Statements usually mention only what the children can not do. They underline children's disabilities and rarely mention what the children can accomplish.

*"Statements say that children do not have time perception or visual memory, he cannot do this, she cannot do that… "*

The statements are based on a check of the algorithm of the additions, subtractions, multiplications and divisions. They follow a mechanical view of mathematics focusing on number and arithmetic and not a functional level assessing geometry and measurement.

*"the statement says that the child cannot make additions or multiplications or she has difficulties in divisions"*

*"statements are written within two, three or lines and they do not give us any useful information. Even the longer statements do not give us a clue, at least in my case, how to work and what to do. I have to make an analysis of the children's problem I on my own"*

Even when statements mention difficulties in mathematics teachers themselves should assess each child in order to realize what the difficulties are. One aspect of their role is to make informal testing and assessments. Each teacher uses his/her assessment tests which are personal and have different contents according to what the teacher thinks that the child should have already known. The domains of mathematics that are assessed create on the one hand representations of the "official knowledge" (what students ought to have learnt) and on the other hand they create the specific type of difficulty compared to this "official knowledge".

*"It is November and I am still occupied with children's assessment on literacy and mathematics. It takes me a lot of time to assess them and make a decision which activity and which exercise to choose to assess and which not to pick"*

Although teachers highlight the fact that statements usually do not mention anything about mathematics they report that they also devote less time in teaching mathematics because they feel that reading should be taught first.

*"the main goal is to teach literacy and later on you work on mathematics"*

*"Society makes me teach literacy more hours than mathematics because children should learn how to communicate"*

*"the truth is that I do not devote some much time to mathematics because the time is limited and when there are many problems with reading we work more on it"*

Since literacy is considered more important than numeracy, assessment procedures as well as teaching follow the saying "first things first" which is interpreted "teach literacy first and numeracy afterwards". This fact presupposes that there is a linear development of abilities and skills.

In many cases children were the permanent attendants of Inclusion Units because there was no official re-assessment from the diagnostic center. Usually children are re-assessed after Grade 6 before they register at High School.

*"When I first saw the child I was wondering "what is he doing here (at Inclusion Unit)? What is his diagnosis?" "His diagnosis was learning difficulties when he was Grade 3 and now he is Grade 6 and there hasn't been any recent statement. Now the only thing he needs is some practice, only this"*

**How it is Taught: Teaching of Mathematics in Inclusion Units**

There was not a single case of a child that was taught only mathematics in Inclusion Units in this study. Children usually were taught both mathematics and literacy. The time of withdrawal at Inclusion Unit was differentiated according to the age of the children and their needs as well as the school timetable. The co-teaching of mainstream teacher and the inclusion unit teacher was something difficult to achieve within mainstream classrooms because of limited time. Co-teaching happened only occasionally (2-3 times a year) at very few schools mainly for Grade 1 and grade 2 when the Inclusion teacher wanted to see how the child interacts with others.

How mathematics was taught was a quite complicating issue and depended on the context and the number of students. It could take the following modes:

1) 45 minutes teaching mathematics as an autonomous lesson
2) The 45 minute lesson is divided in 25 minutes teaching mathematics and 20 minutes teaching literacy as separate lessons
3) During the 45 minutes lesson the teacher uses a project (cross thematically integrated lesson) and mathematics is taught as an activity within the project.

It is interesting to note that even the same teacher could use different modes of teaching mathematics in a lesson of 45 minutes for the same child.

Children were taught either individually or in groups.

1) Individually, the child stayed at the Inclusion Unit with the teacher for an individual one- to-one lesson for 45 minutes.
2) Two children of the same level (not the same age, not the same Grade) were taught the same or similar activities in mathematics. For example a 7 year old child of Grade 2 could be taught together with a 12 year old child of Grade 6.
3) Two students of different level (different age or different Grade) and different statements were grouped together because of limited time. The possibilities were:

a. Each child did his/her own mathematics activities and the teacher tried to help each one when s/he needed it for the whole lesson of 45 minutes
b. The lesson was divided in 22 & 22 minutes so half of the lesson the teacher was working with the one child and the other child was doing some drill and practice on the computer
c. One child was doing literacy activities and the other child was doing pen and pencil exercises in mathematics

4) There was a group of three students at the Inclusion Unit but the one student was working on the computer or was just present and the other two students worked as it was described above. The presence of the child within the group of two was a way of letting the mainstream class work without disturbances.

The above different modes of organisation might co-exist in the same Inclusion Unit by the same teacher. Teacher's decision depends on the how well each child can function with the presence of another child in behavioral and cognitive level as well as the teachers' working hours. The important factors are:

- whether children can cooperate or can just be compatible cases that cannot cause disturbances to one another
- whether children are at the same level so that the same teaching can be effective for all
- the number of children requiring withdrawal at the Inclusion Unit and the types of their difficulty
- teacher's working hours

Many times grouping children was used as a trick in order to have another child to interact with and create a more joyful learning situation. According to social constructivism learning is an active social process that learners construct meaning from interactions with others and thus classroom community is highlighted.

Teaching mathematics took different modes and this could be quite challenging. However the most decisive factors for mathematics teaching seem to be both child's needs but teacher's time as well. If a child attends a school and a few children require teaching at the Inclusion Unit it means that the teachers' working hours (20 -25 hours per week) will be divided to the number of the children. If the same child attends another school with fewer children that require teaching at the Inclusion Unit she/he should stay more hours at the Inclusion Unit.

**What is Taught: Students' needs and Teacher Role**

The role of the inclusion Unit teacher during the mathematics lesson is diverse depending on the child. We created a typology of children with disabilities and learning difficulties but this does not mean that the first is more important than the other and in no case we mean that they are homogeneous groups of people. However, school life and everyday teaching practice created the following categories.

a) Students with disabilities

If the children have severe disabilities they are withdrawn from their mainstream class while their peers do mathematics. In this case teaching mathematics is a main role of the Inclusion Unit teacher and s/he is quite autonomous to what and how s/he teaches. Actually the teacher delivers a Curriculum that has nothing to do with the Grade Curriculum. Students with disabilities are usually taught the number sense, time line, and algorithms of additions and subtractions. Greek teachers usually use the phrase "we learn" implying the common, shared effort towards learning.

"We learn the numbers, the number sense and the number line. We use real objects for counting. Some use their fingers and they can make additions and subtractions up to twenty. But not multiplication and division"

At higher grades students usually learn how to use the calculator and try to solve simple problems of real life. For example, handling money or telling time.

*"She is at Grade 6, her diagnosis says mental retardation. I cannot understand how she can solve something with hundreds and if I ask her a subtraction up to twenty she sometimes cannot find it. However now she can use the calculator when we try to solve problems. She can solve simple problems but after some discussion"*

Teachers try to connect mathematics with real life using games, role playing and every day apparatus. They are quite flexible to what and how they teach. They have the time to get to know with each student and realize where exactly their difficulty is. They can follow the students' pace and work step by step. This creates a lot of responsibilities and stress because they feel that they are responsible for the things the children should or should not learn.

*"My main agony is if I make the right decisions and if I choose what has really meaning for the life of this child. The burden of the responsibility is only on my back"*

*"I feel insecure, where and how to start and how to proceed".*

How each school responds to different children with the same disability is quite versatile. The disability per se can not imply what the child can achieve at mathematics over the years. For example a child with Down syndrome can solve additions.

*"She can solve simple additions up to 100"*

Another child with Down syndrome at another school can solve simple multiplications and divisions.

*"this child can solve simple one digit multiplication facts and few one digit division facts"*

A third child with Down syndrome at a third school was not taught mathematics at all because the teacher said that his state was quite difficult.

*"We decided not to work on mathematics because M. was not mature. I had to finish teaching basic literacy so that she could understand my directions and now we should start mathematics"*

The same happens with children that are in the Autism Spectrum. Some children manage to follow their mainstream text book but other children not. The most basic problem is children's negativity towards mathematics. All the teachers mentioned that planning teaching in advance is difficult to achieve because students reactions to the mathematics activities cannot be foreseen. Teachers should be reflective and ready to take advantage of the situation and student's mood in order to make mathematics meaningful for the children.

b) Students with learning difficulties

Students with learning difficulties usually stay during their mathematics lesson in their mainstream class. They attend the Inclusion Unit one or two hours per week when their peers do Religion, Citizenship or Nature lessons. Teachers' role in this case is supportive and they follow the mainstream class curriculum. Teachers usually say that these students want some more practice at algorithms

*"He comes only for some practice"*

*"As far as mathematics is concerned his problems are not with the understanding but with practice and he comes here in order to practice more"*

*"He finds difficult to do the algorithms, mainly at subtractions and he does additions right occasionally"*

*"There are children at higher grades that have the same difficulties as children of younger age at lower grades but at a different level. For example at Grade 4 or 5 children have difficulties with additions and subtractions of multi-digit numbers while children at Grade 1 or 2 have difficulties with additions and subtractions of two digit numbers. The difficulty at algorithms is something vague. Even if it sounds the same problem it is not the same. "One can achieve to solve additions within decade but when tries to do the same with three digit numbers he cannot do this"*

*"They have difficulties with memorizing the multiplication tables: "*

*"There are difficulties at the understanding of problems. Even at a very simple problem of two lines when he reads it he cannot get the meaning and if I read the problem he could understand it and he could find the correct fact at least the one and some time he could find the correct result"*

**Conclusions**

Half of the students who are taught mathematics in Inclusion Units do not have a reported difficulty in mathematics in their statements. Despite the reference of mathematics at the definitions of learning difficulties, statements seem to ignore or underestimate mathematics. In the literature there are some studies reporting that Diagnosis committees often make questionable accommodations for students with special educational needs based on cost effective solutions (Gibson et al, 2004). On the other hand there is some research that has reported in practices that a number of factors weaken the connection between student's assessment and delivery of accommodation on assessment (Shriner & DeStefano, 2003).

The term learning difficulties on statements is used as a synonym to reading difficulties. Statements seem to mirror the overrepresentation of literacy compared to numeracy in research publications and may reflect the more important societal concern with literacy rather than numeracy. Similarly teaching and statementing seem to follow a mechanical view of mathematics and put less emphasis on geometry and measurement compared to algebra and algorithms. Dowker (2005) admitted that it is risky to assume that a child does not understand mathematics because he/she performs poorly at some calculation facts.

The results of this study revealed that students usually tend to stay in Inclusion Units until they graduate primary school because there is no re-assessment. Longitudinal studies reveal that

(Geary et al, 2000) mathematics difficulties are not stable over time for the same children and identified some children who showed difficulties on a standardized test in first grade but not in second grade. An explanation could be that either these children manage to keep up with the others and outgrew their difficulties or the children were initially misidentified as having a difficulty.

Students with disabilities do not attend mathematics in their mainstream classrooms and are taught an autonomous curriculum in Inclusion Units. Students with learning difficulties attend mathematics at their mainstream classroom and at Inclusion Unit they make more practice to the Curriculum of their grade. There are different modes of grouping students which depend on students' needs and teacher's teaching time as well. However, more research should examine whether teachers' decisions are based only on the category of disability and are not differentiated and individualized (Sireci et al, 2003).

Teachers' responses reveal that teachers place emphasis on rote learning, mastery of math facts and algorithms, rather problem solving and reasoning (Swanson, Hoskyn & Lee, 1999). Didactic teaching and rote instruction fail to make students achieve a sufficient conceptual understanding of the core concepts that underline the algorithms (Baroody & Hume, 1991). The technological advances and the everyday use of devices that can make computations fast and easily for the people question the usefulness of these pen and pencil drills and practices of operations. In other words teachers focus too much on technical issues and do not focus on the core of reasoning. They devote a lot of time trying to make students memorise facts and multiplication tables that students should not need since they can use a calculator or the mobile phone. We have to reconsider what students need to know in an era full of computing devices (Goldman, Hasselbring et al, l997). Spending so much time on computational drill and practice may not be beneficial for students facing difficulties within the procedure but not with the reasoning. Replacing extensive pen and pencil practice with the thoughtful use of calculators could be beneficiary for the children (Woodword & Montague, 2002; Woodword et al, 1999). We should move from hand-computation practice to sense making in mathematics.

One constraint that came up in all interviews was the limited instruction time. Due to time restrictions teachers had to divide their time to both literacy and mathematics and this division worked in favor of literacy. However the time we devote to a subject influences what, how much and how long we teach certain concepts. Time constraints should make us examine carefully two issues. First we should dare ask what we want students to learn and how can we implement this. Second we should dare reform education placing students' needs at the center and appoint as many teachers as are necessary.

There is need to reform education and try to re-organise teaching. The students should be in the center of educational process (Covington, 1992) and their needs should be addressed without thinking for example, how many school children there are and how much time the teacher can divide to the students. Children need teaching time not teaching that remains after calculating and dividing teaching time. School teachers should decide how many hours each child needs special teaching and then there should be the appropriate allocation of the number of the teachers.

A critical challenge for future research is to focus on developing principles and concepts that permit the accumulation of more cohesive and conclusive body of research. Action research in different settings could provide working hypotheses and ideas that can be tested and evaluated in practice. We hope that this study will be helpful to practitioners because a common practice of teaching mathematics in Inclusion Units is revealed. The findings will be of some value to policy makers in order to reorganize schooling and make necessary reforms.

**References**

Abbott, M., Walton, C., Tapia, Y., & Greenwood, C. R. (1999). Research to practice: A “blueprint” for closing the gap in local schools, *Exceptional Children*, 65, 339-352.

Baroody, A., & Hume, J. (1991). Meaningful mathematics instruction: the case of fractions, *Remedial and Special Education*, 12, (3), 54-68.

Burns. (2005). The building blocks of math: My favorite ways to teach addition and subtraction in the early grades. Retrieved February 9 2012 from http://www.findarticles.com/p/articles/mi_m0STR/is_3_115/ai_n15875362

Burns, M. K., & Ysseldyke, J. E. (2009). Reported Prevalence of Evidence-Based Instructional practices in Special Education, *Journal of Special Education*, 43, (1), 3-11.

Cook, B., Landram, T. J., Tankerseley, M., & Kauffman, J. M. (2003). Bringing research to bear in practice. Effective evidence-based instruction for students with emotional or behavioral disorders. *Education and Treatment of Children*, 26, 345-361.

Covington, M. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. New York: Cambridge University Press.

Dowker, A. (2005). Early identification and intervention for students with mathematics difficulties, *Journal of Learning Disabilities*, 38, (4), 324-332.

Elliott, S. N., Kettler, R. J., Roach, A. T. (2008). Alternate assessment of modified achievement standards: More accessible and less difficult tests to advance assessment practices*? Journal of Disability Policy Studies*, 19, 3, 140-152.

Fuchs, L. S., Fuchs, D., Prentice, K., Burch, M., & Paulsen, K. (2002). Hot math: Promoting mathematical problem solving among third grade students with disabilities. *Teaching Exceptional Children*, 34, 70-73.

Geary, D. C. (1994). *Children’s mathematical development: research and practical applications.* Washington, D.C.: American Psychological Association.

Gersten, R., Baker, S., & Lloyd, J. W. (2000). Designing High Quality Research in Special Education: Group Experimental Design. *Journal of Special Education*, Spring, 34, (1), 2-18.

Gibson, D., Haeberli, F. B., Glover, T. A., & Witter, E. (2004). The use of recommended and provided testing accommodations. *Assessment for Effective Intervention*, 31, (1), 19-36.

Goldman, S., Hasselbring, T., & the Technology group at Vanderblt. (1997). Achieving meaningful mathematics literacy for students with learning disabilities. *Journal of Learning Disabilities*, 30, (2), 98-108.

Horton, S., Lovitt, T., and White, O. (1991). Teaching mathematics to adolescents classified as educable mentally handicapped: Using calculators to remove the computational onus. *Remedial and Special Education*, 13, (3), 36-61.

Howell, K., & Nolet, V. (2000). *Curriculum-based evaluation: Teaching and decision making* (3rd ed), Belmont, CA: Wadsworth Thompson Learning.

Hudson, P., & Miller, S. P. (2006). *Designing and implementing mathematics instruction for students with diverse learning needs*. Boston: Allen & Bacon.

Kelley, B., Hosp, J. L., & Howell, K. W. (2008). Curriculum-based evaluation and math: An overview. *Assessment for Effective Intervention*, *33(4),* 250-256.

Malouf, D. F. (2005) Accommodation research to guide practice: Comments on what we know and what we need to know. *Assessment for Effective Intervention*, *31(1),* 79-83.

Plake, B. S. (2008). Standard setters: Stand up and take a stand! *Educational Measurement: Issues and Practice*, 27, (1), 3-9.

Shriner, J. G., & DeStefano, L. (2003). Participation and accommodation in state assessment: the role of the individualized education programs. *Exceptional Children*, *69,* 147-161.

Sireci, S. G., Li, S., & Scarpati, S. (2003). The effects of test accommodations on test performance: a review of the literature. Amherst: *University of Massachusetts, Amherst, School of Education.*

Strauss, A., & Corbin, J. (1990). Basics of Qualitative Research: Grounded Theory procedures and Techniques. London: *Sage.*

Swanson, L., Hoskyn, M., & Lee, C. (1999). Interventions for students with learning disabilities: A meta-analysis of treatment outcomes. New York: *Guilford Press.*

Weinner, B. (1992). *Human motivation: metaphors, theories and research*. Newbury Park, CA: *sage.*

Woodward, J., Baxter, J., & Robinson, R. (1999). Rules and reasons: Decimal instruction for academically low achieving students. *Learning Disabilities Research and Practice*, *14(1),* 15-24.

Woodward, J., & Montague, M. (2002). Meeting the Challenge of Mathematics Reform for Students with LD, *Journal of Special Education*, Summer, *36(2),* 89-101.

Yang, X., Shafiel, J., Glasnapp, D., Poggio, J. (2005). Qualitative or Quantitative differences? Latent class analysis of mathematical ability for special education students. *Journal of Special Education*, Winter, *38(40),* 194-207.

Zoniou-Sideri, A. (2005). Contemporary integration approaches. Athens: *Ellinika Grammata*.

**Evangelia Boutskou** graduated from the School of Education, Aristotle University of Thessaloniki. She did postgraduate studies at the University of Manchester, University of Sheffield and taught at the Aristotle University of Thessaloniki and University of Thessaly. She worked at primary education as an inclusion teacher and head-teacher. Her articles were published in national and international journals and conferences.