BABEŞ-BOLYAI UNIVERSITY CLUJ-NAPOCA
FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES
DEPARTMENT OF PSYCHOLOGY

USING COMPUTER TECHNOLOGY IN WRITTEN LANGUAGE DISORDER THERAPY

ABSTRACT OF DOCTORAL THESIS

Scientific coordinator:

Prof. Univ. Dr. JURCĂU NICOLAE

PhD student:

TALAŞ DORINA-ANCA

CLUJ-NAPOCA

2011

TABLE OF CONTENTS

PART I

KEY WORDS: computer assisted instruction, educational software, assistive technologies, written language disorders, orthograms, universal design for learning, learning disabilities, electronic lessons “Let’s write correct orthograms!”, resource teacher.

With the accelerated development of nowadays society, using information and communication technologies in schools has become a necessity. For many of us it is very difficult or even impossible to imagine a day without a computer. The school is constantly adapting and transforming to meet the society needs. Introducing information and communication technologies in education is absolutely necessary.

Learning the correct way of writing orthograms requires more work, many exercises and for students with learning difficulties the correct spelling of ortogramelor is a target very hard to be reached. The resource teacher plays an important role in achieving this goal through all activities he/she is involved in: partnership or resource room activities. Information technologies can be successfully used in achieving this target.

The purpose of this study was to investigate the impact of computer technology , especially the impact of an educational software designated for learning to write orthograms correctly with a special design for children in second and third grades diagnosed with learning disabilities.

The dissertation is organized in nine chapters, the first five chapters are dedicated to the theoretical framework, the next three chapters present the study conducted, and the last chapter presents the final conclusions of the dissertation.

The first chapter introduces the definition of concepts from the perspective of several authors, a brief history of development of computer assisted instruction from the first machine that recorded multiple choice answer invented by Sydney Pressy în 1924 , continuing with digital computer invented by John Vincent Atanasoff and Clifford Berry in 1939, then IBM microcomputers products at the beginning of 1960s. TICCIT and PLATO programs were among the first programs for education.

Classification of computer assisted instruction programs is presented using following criteria: the utility, pedagogical function, the discipline and by type of design used for their preparation.

Roblyer (2005) makes this classification of instructional software using pedagogical function criteria:

- Drill-and-practice software functions
- Tutorial software functions
- Simulation software functions
- Instructional game software functions

- Problem-solving software functions
- Integrated learning systems

The advantages and disadvantages of using computer-assisted learning and different global and national approaches for computer-assisted instruction are parts of this chapter. Dweyer (1994) brings în shows that the effective integration of communications technologies in learning process is possible when the teacher changes teaching strategies and move from teacher-centered activities to learning-centered activities. Waxman C, Meng-Fen Lin Georgette M. Michko (2003) explore the studies about the efficiency of computer technology in education and they concluded that the results of using computer technology in schools are great, students improved their achievements. Bialo and Sivin-Kachala (1996) study confirms that the students self esteem and their attitude towards learning, the motivation had improved when teachers are using computer technologies in teaching.

The most important software designated to improve writing for students with learning disabilities are: *Co:Writer 4000, Kurzweill 3000, Test Talker, Talking Word Processor, WYNN, Yak-Yak, Dragon Naturally Speaking, Clicker 5, Inspiration & Kidspiration.* In Romania for example, a multidisciplinary team from "Babeş-Bolyai"University has developed the educational software “Letters” Miclea, M., Mihalca L., Moşuţ L., Dohi, I. (2006). This is a very attractive and efficient instrument for learning letters.

Chapter 2 presents the computer assisted instruction in special education. Roberta Wiener (1987, p.18) said: “The potential for computers in special education is without limits. Computer technology can provide a voice for students with oral communication problems; serve as a writing medium for students who have difficulty manipulating a pencil; open the world of written communication for the blind; enable the deaf to communicate in a hearing classroom; and allow the physically disabled the opportunity to control their learning environment.”

The prerequisite necessary for using computer assisted technologies in special education ad the characteristics of computer assisted instruction for children with special education are presented in the same chapter. The stages of developing computer assisted instruction in special education are presented also. It is absolute necessarily to define learning disabilities and to respect all the stages presented for an effective teaching process.

Chapter 3 is dedicated for children with learning disabilities inclusion. We define terms like integration/inclusion and we present the basic principle to promote inclusive education. Ghergut A. (2001, p.12) believes that integrated education "refers essentially to the integration in regular classes of children with special needs (children with sensory disabilities, physical impaired, intellectual or language disabilities, social disadvantaged -economical and cultural, health and child care centers, children with mild emotional and behavioral disorders, children infected with HIV, etc..) to provide a climate conducive to a balanced and harmonious development of their personality. "

Plosca M. şi Moldovan A.M. (2011, p 21) present levels of integration in the school environment proposed by Vrăşmaş:

- Spatial integration;
- Social integration;
- School integration;

School inclusion refers to the inclusion of school children with different disabilities in all school activities in which normal children are involved. This requires real involvement of schools and classes by adapting and changing to meet the needs of children with disabilities and focusing on recovery and assessment of each child's potential. This definition of inclusion does not mean that students with different disabilities will not receive outside expert assistance and training outside the classroom, but that it is one of many options available for students with disabilities and normal children. (Loreman and Deppeler 2001)

Plosca M. and Moldovan A.M. (2011, p 21) cites the definition of inclusive education made by the MEN and UNICEF (1999): "Inclusive education involves an ongoing process of improving the school as an institution, the principal aimed is exploiting existing resources, especially human resources to support participation of all students in education process within a community. "

European Agency for Development in Special Needs Education 2009 presents the key principles for promoting quality in inclusive education.

- Widening participation to increase educational opportunity for all learners;
- Education and training in inclusive education for all teachers;
- Organizational culture and ethos that promotes inclusion;
- Support structures organized so as to promote inclusion;
- Flexible resourcing systems that promote inclusion;
- Policies that promote inclusion;

- Legislation that promotes inclusion;

Universal Design for Learning and the importance of the resource teacher to support successful inclusion for children with learning disabilities are topics presented in this chapter. The Universal Design for Learning concept is defined by the Center for Applied Special Technology (CAST) in'90. Universal Design for Learning includes all methods, tools and teaching strategies that enable students to acquire skills, knowledge and motivates students to participate in learning activities. Hallahan and Kauffman (2006, p. 541) define the universal design for learning as " a design new training programs that enable their use by a great number of potential users".

The resource teacher diagnose children with special needs, creates individualized educational plans for each student with special needs, collaborates with all school teachers, other professionals and parents, mediate conflicts between students participates in extracurricular activities and develops or adapts methods and existing materials to the children's needs and possibilities.

Chapter 4 presents writing as a complex activity, the decoding of an additive message, a transformation of phonemes into graphemes using different instruments and the three writing systems: (1) pictographic writing, (2) syllabic writing, (3) alphabetic writing.

Orthography is defined by Şuteu F. (1981, p. 86) as „ a system of precise, fix, and unit rules consisting explaining the value of a of signs from a graphic system of reproduction of language, formulating conditions for the use of these signs, a system designed to generalize and to stabilize the cultivated version of the given language. The term "orthogram" is defined in the Explanatory Dictionary of Romanian Language as a model of correct language.

The first orthograms are introduced in first grade, but the teaching process of orthograms starts in second grade. When students begin to write correctly orthograms, it is assumed that they have mastered the correct spelling of letters, words and sentences. In the first phase writing orthograms does not require grammatical knowledge, it is not based on students' learning, it is based on learning specific rules (eg. We write "sau" when it can be replace with the word "or. ") and by presenting some examples.

Hyphens and diacritical marks are elements present in orthographic writing.
We offer a model of writing skills development stages presented by Gentry (1982):

1. Pre-communicational stage;

2. Semi-phonetic stage;
3. Phonetic stage;
4. Transition stage;
5. Conventional writing stage;

Language disorders are defined by the American Speech-Language-Hearing Association (1993, p. 40) as a deficiency in understanding and/or verbal language, written language and/or another symbolic system. The deficit refers to:

• Language form (phonology, morphology and syntax);
• Content language (semantics);
• Communication function language (pragmatic);

Etiology of written language disorders is presented using the model proposed by Green (1983) and Ungureanu (1998).

Classification criteria for written language disorders are:

a) The dominance of disturbed structures (Paunescu in Vrasmas 2007, p. 89);
b) Stage appearance, form and evolution;

Green E. (1983) adopted the classification of dyslexo-disgraphic after Falinski and lists the following types of dysgraphia:

a) agraphia - the inability to draw and write (tumor, brain injury);
b) paragraphia - the child can write letters separately and not united;
c) structural dysgraphia;
d) dysortographia, when punctuation and spelling are not used;
e) bad spelling;

Deuel (1994) classified dysgraphia into three subtypes:

• Dislexo-dysgraphia;
• Motor dysgraphia due to motor causes;
• Dysgraphia due to spatial perception deformity;

Roberts and Stodden (2005) cites Blalock (1981) which estimates that 80% - 90% of students diagnosed with learning disabilities experience difficulties in writing skills development. Many of the problems described can be eliminated using the computer in tasks that involve writing.

The table below presents a comparison of the necessary skills the students should have to write a letter when using different tools.

Table 1. *Comparative overview of necessary skills to write a letter with pen and paper and with a computer*

Necessary skills to write a letter with pen and paper	**Necessary skills to write a letter with a keyboard**
- Hold a pencil with three fingers with or without a suitable support. - To press with appropriate amount of pressure the writing tool to make graphic forms. - To achieve the correct finger coordination of large muscles and fine muscles of the other fingers. - To visualize the letter. - To remember the movement needed to write the letter. - To draw the letter. - To monitor the accuracy of motor commands for muscles to move with appropriate force and distance. - Respect the letter size. - To write the letter on a line. - To leave the space between the written letter and the next written letter.	- To move fingers independently; - To recognize the letter. - To locate the letter on the keyboard. - To press the corresponding keyboard with moderate pressure.

Written language disorders are diverse for children with learning disabilities. It is necessary to assess them carefully for an effective intervention to prevent and correct them.

Chapter 5 summarize the assistive technologies used for an efficient learning and practicing writing for students with learning disabilities. A legal, formal definition of access technologies was first published in Technology-Related

Assistance for Individuals with Disabilities Act of 1988 in USA (The Tech Act). Access Technologies term means any item (item), equipment, product or system, whether it is purchased off the shelf, modified or adapted, which is used to maintain or improve functional capabilities of people with disabilities. This also includes any service that directly benefit a person with disabilities in the selection, acquisition or use of access technology. (IDEA 2004, PL 108-446).

In the recent years increased interest in using assistive technology for students with written disorders, particularly for pupils with learning difficulties. These technologies include word processors, spell checkers, word prediction, speech recognition and software that converts text to speech (Berninger & Amtmann, 2003 , MacArthur, 1996, 1999, 2000). These technologies are not designed to replace the teaching of writing as a process, but occur as a bridge to support the acquisition of writing skills especially for students who have writing difficulties.

Hetzroni and Shrieber (2004) continued Owston and Wideman's (1997) research argues that a comparative longitudinal study between two primary groups of students with and without access to word processing has demonstrated that students who had access to a word processor demonstrate significant increase in writing skills in following areas: meaning writing, quality of content, form of writing and writing organization.

Zhang's (2000) research demonstrate that the assistive technology provides students with learning disabilities the essential support to integrate in mainstream schools. Assistive technologies allow students with learning disabilities to attend general curriculum. They help the student to transform the written tasks in classic format in electronic format, allow detailing, organization and editing writing tasks and they motivate students to solve with pleasure writing tasks.

The same author believes that students with learning disabilities better focus on the structural development of ideas, sentences, phrases and paragraphs using assistive technologies. Using word processor technologies with other technologies provides students with learning disabilities the opportunity to practice writing skills the same way the other students without disabilities do.

Assistive technologies recommended to improve learning and practicing writing for students with learning disabilities are: word processors, portable word processors (eg AlphaSmart, Fusion, Quickpad), spell checkers, word prediction, computer pen, programs to correct the written text, speech recognition software, voice

synthesizers / text readers, alternative keyboards, electronic dictionaries and corrective "talking", electronic tablet, pencil grip and weights glove.

Teachers have to know the following characteristics so they can recommend the most appropriate assistive technologies:

1. each student abilities and needs;
2. curriculum objectives;
3. different ways of monitoring and evaluation the student progress;
4. the characteristics of assistive technologies;
5. the cost for the assistive technologies;

We presented some recommendations and challenges for students with learning disabilities using assistive technologies to improve learning and practicing writing.

Chapter 6 presents SIAC-V2.0 software, a lesson generator and a set of electronic lessons “Let’s write correct orthograms!”. The authors of SIAC V2.0 generator define this program as " an author software for the completion of learning lessons and / or evaluation may be conducted in a local area network.

The system is running under Windows 9x, 2000 and is composed of two main applications:

⇒ Generator Lessons - GEL;

⇒ Ongoing Environment – MED;

Using SIAC generator V2.0, the teacher can develop electronic lessons with the following tasks:

1. Questions with free answers;
2. Forms with free responses;
3. Answer questions orally;
4. Choice of zones;
5. Mark areas;
6. Form with offers;
7. Ordering images;
8. Game "Guess the word. "

One of the advantage of SIAC V2.0 is flexibility in lessons. It can be used to create electronic evaluation lessons regardless of curricula content, to structure

materials in a set of lessons, and to update the lessons, depending on student performance.

The electronic lessons are developed based on the principles of universal design for learning because:

a) Provide multiple modes of representation;

b) It offers multiple modes of expression;

c) Provides multiple ways of participating.

The electronic lessons refer to the structure of content on topics using an educational software and electronic presentation of that content via the computer in teaching, or assessment process. Electronic lessons are more effective if they can adapt more easily to each student. There are lessons prepared by a group of specialists, that the teacher can use in class, but the teacher can not change or there are educational software that the teacher can use to develop their own electronic lessons depending on the subject, depending on grade level, according to each student needs and according to the teacher's teaching style.

Interactive electronic lessons can be used successfully in special education, if they are designed specifically for students with some type of deficiency or if they are customized to each pupil's needs. For example, students with autism respond more effectively to verbal stimulus, if the feedback contains the name of the student (ex. Good job, Alex!).

Using SIAC software, we developed two electronic evaluation lessons to assess orthograms and six learning lessons including orthograms for second and third grades, as follows:

- an evaluation lesson for second grade;
- an evaluation lesson for third grade;
- two learning / consolidation lessons for second grade;
- four learning / consolidation lessons for third grade;

Duration of a lesson does not exceed 10 minutes, regardless of the student's pace. We felt that at this age students should not spend too much time in front of the computer to avoid fatigue and boredom.

The steps we are going to present have been observed during the process of developing the electronic lessons "Let's write correct orthograms!"

1. Choosing the theme;

2. Establishing the exact beneficiaries that addresses these lessons;
3. Studying the school curriculum and textbooks;
4. Setting the goals;
5. Selection of content;
6. Choosing a feedback for a correct answer and for a wrong answer;
7. Organizing verbal and written material according to the degree of difficulty;
8. Ordering the steps of the electronic lesson;

Here are some advantages of the electronic lessons we created:

- They are reusable, can be run by one or more students whenever necessary;
- They are adaptable to different learning situations;
- They can easily be changed depending on the needs of each student;
- They allow monitoring and storing each student's results;
- We can copy them using a memory stick, CD or even stored and sent through the Internet;
- The main advantage of these electronic lessons is that students like them and they are motivated to solve all tasks in a very short time;
- They can be used freely by all teachers in teaching orthograms;

The seventh chapter covers the research methodology: motivation, objectives and hypothesis of the study, description of participants, instruments and procedure of this study.

I was motivated to create an effective tool came when I worked as a speech therapist and I diagnosed students who have many difficulties in writing orthograms in primary school. Later, as a resource teacher I faced the same problem. I tried to look for ways and means for effective teaching and I realized that the best way would be teaching computer assisted instruction system SIAC V2-0, which I've used a few years ago when I developed interactive electronic lessons for children in preschool for my graduation and dissertation thesis.

Objectives

This study covers the following objectives:

1. To develop an educational software for second and third grade, including all the orthograms from the curriculum;

2. To assess the effectiveness of educational software for students diagnosed with learning disabilities included in the resource program, students who have difficulty in writing correct orthograms.

Hypothesis

1. There are significant statistical differences in errors writing orthograms pretest and post-test by group received training via computer.
2. Solving tasks through a classical training (paper and pencil) determines a significant statistical reduction in errors writing orthograms by students.
3. There are statistically significant differences in terms of progress in writing orthograms by the group who received training via computer and the group that solved the same tasks in classical paper and pencil format.

Participants:

The group of participants is composed of 50 students second and third grades included in the resource program from the following schools: Şcoala *Constantin Brâncoveanu*, Şcoala *Liviu Rebreanu*, Şcoala *Eugen Pora* and Şcoala *Ion Creangă* from Cluj -Napoca, as follows:

Table 2. *Participants in this study*

Group	Grade	Sex		Total
		Masculine	Feminine	
Group of participants who receive training through the computer	a II-a	7	1	8
	a III-a	13	5	18
Group of participants who complete the tasks in classic format "paper and pencil. "	a II-a	5	2	7
	a III-a	13	4	17

A. Dictation

Sample dictation texts were designed to identify participants from second and third grades included in the resource program who have difficulty writing orthograms.

B. Questionnaire for students

The questionnaire for students consists personal data, questions about their interest and experience using computers, educational software and Internet.

C. Questionnaire for teachers

The questionnaire for teachers consists personal data, questions about their interest and experience using computers, educational software and Internet.

D. Educational software “Let’s write correct orthograms!” was designed specifically for students with learning difficulties who have difficulty writing orthograms.

Intervention

At the end of April 2009-2010, when all the orthograms have been taught, the dictation test was applied to students in second and third grades included in the resource program from four schools in Cluj-Napoca. The same person applied dictation test to all participants.

Before informing teachers and resource teachers in mainstream schools, the directors consent was obtained from the schools involved in this research.

The group of participants were established by drawing: group of participants who receive training through the computer and the group of participants who complete the tasks in classic format "paper and pencil."

Questionnaires were applied to all enrolled participants at the first meeting when the groups were formed. The first week we identified participants in this study based on their dictation results.

The second week, the group that received computer training has done electronic testing lesson. The same tasks were solved by the group of participants who performed the tasks in a classic format "paper and pencil.

Once a week, the group included participants who received computer training have gone through an e-learning lesson, and finally a test lesson. The same tasks have been resolved by the group of participants who solved the tasks using "paper and pencil" format. Participants in second grade have completed two learning lessons in two weeks, following a testing lesson next week. Participants in third grade completed four learning lessons in four weeks, and in last week's lesson covered the test lesson.

Table 3. presents the schedule for this study.

Table 3. *The schedule for this study*

NR. CRT.	DATE	ACTIVITY
1.	12.04.2010-16.04.2010	-principles of schools were informed about the purpose of this study and they signed the agreement; -resource teacher were informed about this study;
2.	19.04.2010-23.04.2010	-dictation test was applied to students in second and third grades included in the resource program in four schools in the area of Cluj-Napoca; -the groups of participants were established by drawing: group of participants who receive training through the computer and the group of participants who receive training in classic format "paper and pencil;
3.	26.04.2010 - 30.04.2010	-all participants have completed the evaluation lesson; -questionnaires were applied to all participants;
4.	3.05.2010 - 7.05.2010	-all participants have completed the first learning lesson;
5.	10.05.2010 - 14.05.2010	-all participants have completed the second learning lesson;
6.	17.05.2010 - 21.05.2010	-students in second grade have completed the evaluation lesson; -students in third grade have completed the third learning lesson;
7.	24.05.2010 - 28.05.2010	-students in third grade have completed the fourth learning lesson;
8.	31.05.2010 - 4.06.2010	-students in third grade have completed the evaluation lesson;
9.	27.10.2010	-questionnaires were applied to resource teachers;

The eighth chapter presents the results analysis based on numerical data from the pretest and post-test.

a)Interpretation of results for students questionnaires

Although all schools are equipped with computers, only 32% of students stated that they use computers in school at least once a week. Students may have access to the computer not only during the resource hours, but also during school hours. This is probably due to the low interest of teachers in information and communications technologies. The fact that 72% like typing, can be use in the

Romanian language and literature classes, when developing different projects or during the resource classes. If lessons are presented as games, students will certainly be happy to participate in solving tasks in electronic format, because a percentage of 92% like to play different games on the computer.

88% of students say they have a computer at home, so electronic lessons developed by teachers can be taken by students at home or can be done several projects involving the computer writing.

We believe that students should interact more with computers at school under the supervision of teachers, because 51% of students surveyed believe that they would like more in school if teachers would use the computer more often, and 74% agree they can learn many things using a computer.

b) Interpretation of the results for resource teachers questionnaires

Most teachers have a computer and Internet connection at home, but that there are a large number of resource classrooms are not equipped with computers and a large number of computers in the resource classrooms are not connected to the Internet. There is a lack of educational software in Romanian language for students with special needs.

100% resource teachers consider that the use of computers in education instructor is beneficial and 86% of participants in this study say they want to develop electronic lessons designed for students with special needs. We consider that it is essential to develop lesson generators that enable teachers to develop their own electronic lessons for their students.

We find that all teachers with support in education between 11-15 years old want to develop electronic lessons designed for students with special needs, and providing them with “lesson generators” would allow them to achieve the diversification in the instructional process for the benefit of students with special needs.

They is also required training of teachers in information technology support, and 76% of teachers surveyed agree to participate in these courses.

It is absolutely necessary to provide all the resource classrooms with computers and Internet connections because a percentage shows that 34% of teachers do not have a computer in the resource classroom, and an even higher percentage, 52% had no internet connection. To provide the equipment is the first step in using computer-assisted instruction in resource classrooms.

Resource teachers spend more time on the computer to create work sheets - 46.9% , to maintain records of school - 45.8% and 30.4% say they do not use the PowerPoint application. 51.1% of respondents are using the Internet more than 5 hours per week, while 43.8% say they use the Internet that more than 5 hours per week to find information for their lessons.

After applying this survey reveals that most resource teachers have knowledge of computer using and many teachers want to participate in training courses in information technology and communications. Using computer-assisted learning is not performed routinely in the resource classes because some of the resource classrooms are not equipped with computers and educational software for special needs students.

c) Data analysis pretest and post-test

Data analysis cover the results obtained by browsing or using the teaching method using computer parallel with traditional paper and pencil, two groups of students from different classes, second and third grade. We have the following groups:

- Groups that have received training via computer: the group of students in second grade and the group of students in third grade;
- Groups that have received classical training (paper and pencil): the group of students in grade II and group of students in grade III;

Numerical quantitative data obtained were statistically processed in tables, graphs, charts and data processed using SPSS.

It was found that the when using interactive computerized lessons, there is a statistically significant reduction in errors made by students in second and third grades included in resource program who have difficulty writing correct orthograms. The first hypothesis formulated is confirmed.

In second grade, the group that received classical training (paper and pencil) did not achieve a statistically significant reduction in errors writing orthograms, but in third grade, the group that received traditional training (paper and pencil) achieves a statistically significant decrease in errors writing ortograms. Second hypothesis is confirmed only for third grade students.

The third hypothesis is confirmed also. There are statistically significant differences in terms of progress in writing orthograms by the group who received training via computer and the group who solved the same tasks in classic paper and pencil format.

The ninth chapter presents the final conclusions of this study.

The results obtained in this paper reinforce the claims of researchers Goldberg, A., Russell, M., & Cook, A. (2003) found that students who use computers in teaching writing skills show a standard deviation better .4 than students who use only a pencil-paper writing skills training.

From investigations made by us to students in second and third grades students, diagnosed with learning disabilities who have difficulty writing orthograms, we can say that is highly statistically significant differences between the group of students who received training using the computer and the group of students who received training using traditional methods. Students who have received training using the computer achieved a statistically significant reduction of errors in tasks of writing correct orthograms, compared with students who received only traditional training method using "paper and pencil."

The results of this study allow an overall view of performance of students with learning difficulties who have benefited from training with a computer and performance achieved by students who have received training using the classic “paper and pencil” method to learn writing correct orthograms. Performance evaluation results may be a motivator for resource teachers and other teachers in developing new interactive electronic lessons.

It requires teacher training in designing electronic lessons, computer assisted training courses for initial and continuing training. It is also necessary to promote educational software at conferences and national and international symposia or creating web pages.

All the people in the educational field should be aware that the integration of computer assisted instruction in the educational process of students with learning disabilities is a necessity. It is absolutely necessary to develop educational software such as "lesson generators" easy to use by all the teachers, so they can develop their own electronic lessons depending on the particularities of the group of pupils or a single student.

To exploit the potential of each student with special needs we need to use proper assessment and to develop an individualized education plan that includes the use of assistive technologies and computer assisted instruction respecting the particularities and needs of each student with special needs. Computer assisted instruction and assistive technologies do not exclude traditional teaching methods, but

only complete them to make the whole process of learning to adapt to the needs of students with special needs.

Study value

This study is among the few studies that address issues of using computer technologies in the educational process of students with learning disabilities included in the resource program in Romania. The results may be useful to resource teachers developing individual educational plans for students with learning disabilities, organizing and structuring their lessons.

An original contribution of the thesis is the development of the electronic lessons "Let's write correct orthograms!" for second and third grade diagnosed with learning disabilities enrolled in the resource program.

By providing all teachers with free electronic classroom "Let's write correct orthograms!"we believe that more students will benefit from the advantages of this lessons. We hope that more resource teachers will continue to develop electronic and interactive lessons in other areas.

Study limits

1. This study is limited due to the low number of participants and their characteristics;
2. Profile of participants from urban areas is different from the profile of participants in rural areas and we can not make a national generalization.

New research directions

Because written language disorders in children diagnosed with learning disabilities are varied, we believe that creating new electronic lessons covering other aspects of writing (punctuation, writing with a capital letter, writing with two "i") can be useful in written language disorders therapy.

This study aim was to assess the effectiveness of the use of electronic lessons orthograms process of assimilation of class II and III for students diagnosed with learning difficulties. We propose the development of electronic lessons for the same category of students for other grades and for other disciplines (mathematics, social studies, etc.).

Samples of dictation we used to select participants for this study can be used in testing orthograms in second and third grade, but it is necessary to develop standardized and validated tests to diagnose written language disorders for Romanian language.

It is necessary to make more studies in special education field and using computer assisted instruction in educational process, both in urban and rural areas.

BIBLIOGRAPHY

1. Adăscăliţei, A. (2007). Instruirea asistată de calculator, Iaşi, Editura Polirom.
2. Alessi, S.M. & Trollip, S.R. (2001). Multimedia for learning: Methods and development (3rd ed., pp. 138-179). Needham Heights, MA: Allyn & Bacon.
3. Anca, M., Ciascai L., Ciomoş F.(2007). Dezvoltarea competenţelor didactice şi de cercetare în ştiinţele naturii, Cluj-Napoca, Casa Cărţii de Ştiinţă.
4. Anca M. (2007). Metode si tehnici de evaluare a copiilor cu CES, reeditată, Cluj-Napoca: Presa Universitara Clujeană.
5. Alessi, S.M., Trollio, S.R. (1991) Computer Based Instruction Methods and development, Englewood Cliffs:Prentice Hall, Inc.
6. Auman, M. (2003) Step Up to Writing E. Publisher: Sopris West A Cambium Learning Company.
7. Avram, M. (2002). Ortografie pentru toţi, Bucureşti, Editura Litera.
8. Baker, E., Rozendal, M., & Whitenack, J. (2000). Audience awareness in a technology-rich elementary classroom. Journal of Literacy Research, 32(3), 395-419.
9. Barboş E., Barboş. A.M. (2007). Adaptarea conpenso-recuperare, integrare, Cluj-Napoca, Risoprint.
10. Barnes, B., & Hill, S. (1983). Should young children work with microcomputers--Logo before Lego? The Computing Teacher, 10(9), 11-14.
11. Berninger V, Cartwright A, Yates C, Swanson HL, Abbott R. (1994). Developmental skills related to writing and reading acquisition in the intermediate grades: Shared and unique variance. Reading and Writing: An Interdisciplinary Journal. 1994; 6:161–196.
12. Bernat, E.S. (2003). Tehnica învăţării eficiente, Cluj-Napoca, Presa Universitară Clujeană.
13. Berninger, V., Dunn, A., Lin, S., & Shimada, S. (2004). School evolution: Scientistpractitionereducators creating optimal learning environments for ALL students. *Journal of Learning Disabilities, 37,* 500-508.
14. Berninger, V., & L. O'Donnell. (2004). Research-supported differential diagnosis ofspecific learning disabilities. în A. Prifitera, D. Saklofske, L. Weiss, & E. Rolfhus (Eds.), *WISCIV Clinical use and interpretation.* Scientist-practitioner perspectives (pp. 189-233). SanDiego, CA: Academic Press.

15. Bialo, E. & Sivin, J. (1990). Report on the effectiveness of microcomputers in schools. Washington, DC: Software Publishers Association.
16. Blankenship, T.L., Ayres, K.M., & Langone, J. (2005). Effects of computer-based cognitive mapping on reading comprehension for students with emotional behavior disorders. Journal of Special Education Technology, 20(2).
17. Bocos, M. (2002). Instruire interactivă. Cluj-Napoca, Presa Universitară Clujeană.
18. Bowers, C.A. (2000). Let Them Eat Data: How Computers Affect Education, Cultural Diversity and the Prospects of Ecological Sustainability. University of Georgia Press .
19. Bray, M., Brown, A., Green. T. D. (2004). Technology and the Diverse Learner. A Guide to Classroom Practice. Thousand Oaks, CA Corwin Press, Inc.
20. Burbules, C.N., Callister, T.A., (2000). Watch IT! The Risks and Promises of Information Technologies for Education. Westview Press.
21. Burlea, G. (2007). Tulburarile limbajului scris- citit. Iaşi: Polirom.
22. Castellani, J., & Jeffs, T. (May/June 2001). Emerging reading and writing strategies using technology. Teaching Exceptional Children, 33(5).
23. Cerghit, I. (2002). Sisteme de instruire alternative şi complementare – Stiluri şi strategii, Bucureşti, Editura Aramis.
24. Ciobanu, F., Sfârlea, L. (1970). Cum scriem. Cum pronunţăm corect. Bucureşti: Editura Ştiinţifică.
25. Clements, D., & Sarama, J. (2003). Young children and technology: What does the research say? Young Children, 58(6), 34-40.
26. Cordes, C., & Miller, E. (2000). Fool's gold: A critical look at computers in childhood. College Park, MD: Alliance for Childhood.
27. Cuban, L. (2002). Oversold & Underused Computers in the Classroom. Harvard Univ. Press.
28. Cucoş, C. (2006). Informatizarea în educaţie. Aspecte ale virtualizării formării..Iaşi, Editura Polirom.
29. Cuffaro, H.M. (1984). Microcomputers in Education: why is earlier better? Teachers College Record, 85, pp. 559-568.
30. Cullen, J., Richards, S. B., & Lawless-Frank, C. (2008). Using Software to Enhance the Writing Skills of Students with Special Needs. Journal of Special Education Technology, 23(2), 33-43.

31. Dagdilelis, V., Papadopoulos, (2004). An open problem in the use of software for educational purposes. In: McKay, E. (ed.) Proceedingf ICCE 2004, Australia, p.919–924
32. Dagdilelis, V. (2005). Principles of Educational Software Design. în: Mishra, S., et al. (eds.) Multimedia in Education and Training, pp. 113–134. Idea Group Publishing .
33. Dodge, D., Colker, L., & Heroman, C. (2003). The creative curriculum for preschool. Washington, DC: Teaching Strategies.
34. Drincu, S. (1983). Semnele ortografice şi de punctuaţie în limba română, Bucureşti, Editura Ştiinţifică şi Enciclopedică.
35. Dwyer, D. (1994). Apple classrooms of tomorrow: What we've learned. Educational Leadership, 51(7), 4-10. (EJ 508 281).
36. Edyburn, D. (2003). Measuring assistive technology outcomes in writing. Journal of Special Education Technology, 18, 60-64.
37. Englert, C.S., Manalo, M., & Zhao, Y. (2004). I can do it better on the computer: The effects of technology-enabled scaffolding on young writers' composition. Journal of of Special Education Technology, 19 no1, 5 – 21.
38. Frith.U. (1999). Paradoxes in definition of dyslexia. Dyslexia, 5, 192-214.
39. Gaston Mialaret (1973) Introducţion ala pedagogie", P.U.F.,Paris, pag. 94.
40. Gawlick, T. (2002). On Dynamic Geometry Software in the Regular Classroom. ZDM 34, 85–92
41. Gherguţ A.(2005). Sinteze de psihopedagogie speciala, Iaşi, Editura Polirom.
42. Goldberg, A., Russell, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992-2002. The Journal of Technology, Learning, and Assessment, 2(1).
43. Graur, A. (1995). Ortografia pentru toţi, Bucureşti, Editura Teora.
44. Hallahan, D.P. Kauffman, J.F. (2006). Exceptional learners: An Introduction to Special Education (10 ed.) Boston: Pearson A & B.
45. Hetzroni, O., & Shrieber, B. (2004). Word processing as an assistive technology tool for enhancing academic outcomes of students with writing disabilities in the general classroom. Journal of Learning Disabilities, 37(2), 143-154.
46. Hollebrands, K., Strasser, R., Laborde, C., (2006). Technology and the learning of geometry at the secondary level. In: Heid, K., et al. (eds.) Research on technology

and the teaching and learning of mathematics, Information Age Publishing . p. 155–206.

47. Hristea T., Avram M., Bulgar G., Şuteu F. (1981). Sinteze de limba română, Ediţia a doua, Bucureşti, Editura didactică şi pedagogică.
48. Ionescu, M., Radu, I., (1995). Didactica modernă, Editura Dacia, Cluj-Napoca.
49. Ionescu,M., Radu, I. (2001). Didactica modernă Ed. a 2-a, rev. - Cluj-Napoca: Editura Dacia.
50. Ionescu, Miron & Muşata Bocoş (coord.)(2009). Tratat de didactică modernă. Piteşti: Paralela 45.
51. Jones, I. (1994). The effect of a word processor on the written composition of second-grade pupils.Computers in the Schools, 11, 43-54.
52. Joiţa, Elena, (2003). Pedagogie şi elemente de psihologie şcolară, Craiova, Editura Arves.
53. Johnson, D.C., Cox, M.J. & Watson, D.M. (1994). Evaluating the impact of IT on pupils' achievement. Journal of Computer Assisted Learning, 10, 3, 138-156.
54. Jurcau, E., Jurcau, N. (1999). Învăţăm sa vorbim corect, Cluj-Napoca. Editura Printek.
55. Jurcău, N.(1999). Formarea continuă a personalului didactic, Cluj-Napoca, Ed. U.T. Pres.
56. Jurcău, N. (2006). Psihologia Educaţiei. Ediţia a-VI-a. Cluj-Napoca: Editura UTPRES.
57. Keen, A., (2007). The Cult of the Amateur: How Today's Internet is Killing Our Culture. London, NicolasBrealey Publishing.
58. Kochhar, West, & Taymans (2000). Successful inclusion: Practical strategies for a shared responsibility. Upper Saddle River, NJ: Prentice-Hall.
59. Kulik, J. Kulik, C. C., & Cohen P. (1983). Effectiveness of computer based college teaching: A meta-analysis of findings. Review of Educational Research, 50, 525-544.
60. Kulik, J. A., Kulik, C.-L. C., & Bangert-Drowns, R. L. (1985). Effectiveness of computer-based education in elementary schools. Computers in Human Behavior, 1, 59-74.
61. Labbo, L., & Ash, G. (1998). What is the role of compute r-related technology in early literacy? în S. Neuman & K. Roskos (Eds.), Children achieving: Best practices in early literacy (pp. 180-197). Newark, DE: International Reading Association.

62. Lawton, J., and Gerschner, V. T. (1982). A Review of the Literature on Attitudes Towards Computers and Computerized Instruction." Journal of Research and Development in Education 16/1 , 50-55.
63. Lerner, J.W. (2003). Learning disabilities. Boston, Princeton, N.J: Houghton Mifflin Company.
64. Loreman, T., & Deppeler, J. (2002). Working towards full inclusion in education. Access: The National Issues Journal for People with a Disability, 3 (6). 5-8.
65. Loreman, T., Deppeler, J. & Harvey, D. (2005). Inclusive Education: A practical guide to supporting diversity in the classroom. Sydney: Allen & Unwin. (Co-published in UK, USA, and Canada by Routledge Falmer. Co-published in India by Viva Books).
66. Loreman T,(2007). Seven pillars of support for inclusive education. Moving from "Why?" to "How?", International Journal of Hhole schooling, Vol 3, No.2, 22-38.
67. MacArthur , C. A. (2000). New tools for writing: Assistive technology for students with writing difficulties. Top Language Disorders, August,2000, Vol 20, 85–100.
68. Maldonado, H. (2001). Should computer go to school? A cost-effectiveness perspective. Mimeograph, Stanford University School of Education.
69. McCutchen, D. (2002). Bigining literacy: links among teacher knowledge, teacher practice, and student learning. Journal of learning disabilities, 35(1), 69-86.
70. McGraw-Hill (Author), Sybil P. Parker (Author) (2003). McGraw-Hill Dictionary of Scientific and Technical Terms. NY, McGraw-Hill Professional.
71. Meyers., L. (1985). Programs for early Acquisition of Language (PEAL) [Computer Program] PEAL Software, C.A.,Calabasas.
72. Miclea, M., Mihalca, L., Dohi I. Mosut, L., (2006). Literele. Soft educaţional. ORDA – ISBN – 973-7973-22-4.
73. Miclea, M, Mihalca,L., Mosut, L., I. Dohi. (2003). Cifrele. Soft educaţional ORDA.
74. Miclea, M. . Mihalca, L., Mosut, L., I. Dohi .(2003). Matematica. Rătăciţi pe insula calculelor, Soft educaţional, ORDA.
75. Mokros, J. R., and Tinker, R. F.(1987). The Impact of Microcomputer-Based Labs on Children's Ability to Interpret Graphs. Journal of Research in Science Teaching 24/4 (1987): 369-383.

76. Montgomery, D., & Marks, L. (2006). Using technology to build independence in writing for students with disabilities. Preventing School Failure,50(3), 33-38
77. Murphy, R.F., Penuel, W.R., Means, B., Korbak, C., Whaley, A., Allen, J.E.(2002). "E-DESK: A Review of Recent Evidence on the Effectiveness of Discrete Educational Software," SRI International.
78. Noveanu, E. & Istrate, O. (2005). Proiectarea pedagogică a lecţiilor MM. Modulul II. Problematica obiectivelor. Bucureşti: Preprint.
79. Noveanu, G.N. şi Nenciulescu S.C. (2005). Chimie. Didactica chimiei 1. Proiectul pentru Învăţământul Rural. Bucureşti: Ministerul Educaţiei şi Cercetării.
80. Okolo, C.M. (2005). Interactive technologies and social studies instruction for students with mild disabilities. In D. Edyburn, R., Boone, & K. Higgins (Eds.), The Handbook of Special Education Technology Research and Practice (pp. 623-641). Milwaukee, WI: Knowledge by Design.
81. Oppenheimer, T., (2003). The Flickering Mind. Saving Education from the False Promise of Technology. N.Y., Random House.
82. Papadopoulos, I., Dagdilelis, V. (2006). The Theory of Transactional Distance as a framework for the analysis of computer aided teaching of geometry. The International Journal for technology in Mathematics Education 13(4), 175–182.
83. Parsad, B. & Jones, J. (2005). Internet access in U.S. public schools and classrooms: 1994-2003 (NCES 2005-2015). Washington, DC: U.S. Department of Education, National Center for Education Statistics.
84. Pat Chick (2007). Sprijin individualizat pentru învăţare Ghid pentru cadrele didactice, Bucureşti, Editura Didactică şi Pedagogică, R.A.
85. Păunescu C. (1967).Tulburările limbajului scris, Bucureşti, Editura Didactică şi Pedagogică.
86. Plosca M., Moldovan A.M., (2011). ABC-ul incluziunii şcolare, Cluj-Napoca, Editura Eurodidact.
87. Preda, V., (2000). Orientări teoretico-praxiologice în educaţia specială, Cluj-Napoca, Presa Universitară Clujeană.
88. Preminger, F., Weiss, P. L., & Weintraub, N. (2004). Predicting occupational performance: Handwriting versus keyboarding. American Journal of Occupational Therapy, 58, 193–201.
89. Prifitera, A., Saklofske, H. D., Weiss, G.L.,(2008). WISC-IV clinical assessment and intervention (2nd ed.). San Diego, CA: Academic Press.

90. Radu ,T Ion, Ezechil L. (2005). Didactica - Teoria instruirii, Piteşti, Paralela 45.
91. Rădulescu, I. Ş. (2006). Erori frecvente în limbajul cotidian, Bucureşti, Editura Niculescu.
92. Roberts, K., & Stodden, R. (2005). The use of voice recognition software as a compensatory strategy for postsecondary education students receiving services under the category of learning disabled. Journal of Vocational Rehabilitation, 22, 49-64.
93. Robertson, E. B.; Ladewig, B. H.; Strickland, M. P.; and Boschung, M. D. (1987). Enhancement of Self-Esteem Through the Use of Computer-Assisted Instruction. Journal of Educational Research 80/5 (1987): 314-316.
94. Robley, M.D. & Edwards J. (2000). Integrating Educational Technology into Teaching, (Second Edition), Upper Saddle River: Prentice Hall Inc.
95. Roblyer, M. D. (2005). Integrating Educational Technology into Teaching (4th ed.). Prentice Hall.
96. Rose, D., Hasselbring, T. S., Stahl, S., & Zabala, J. (2005). Assistive technology and universal design for learning: Two sides of the same coin. în D. Edyburn, K. Higgins, & R. Boone (Eds.), Handbook of special education technology research and practice (pp. 507-518). Whitefish Bay, WI: Knowledge by Design, Inc.
97. Roşan, A., Marcu, S. (coord.). (2007). Învăţăm împreună – repere metodologice în educaţia incluzivă. Cluj-Napoca, Ed. Alma Mater.
98. Rota, D. R. (1981).Computer assisted instruction, lecture instruction, and combined computer-assisted lecture instruction: A comparative experiment. Unpublishied doctoral dissertation, University of Pittsburgh.
99. Sailor, W., & Skrtic, T. (1995). American education in the postmodern era. In J. L. Paul, H. Rosselli, & D. Evans (Eds.), Integrating school restructuring and special education reform (pp. 418–432). Ft. Worth, TX: Harcourt Brace College Publishers.
100. Salend, S.J., & Duhaney, L.G. (1999). The impact of inclusion on students with and without disabilities and their educators. Remedial &Special Education, 20(2), 114-127.
101. Seymour Philip HK.(2005). Theoretical framework for Beginning Reading in Different Ortographies în Handbook of orthography and literacy . De R. Malatesha Joshi,P. G. Aaron (Pg. 444) Lawrence Erlbaum Assoc Inc.

102. Serdean I.(2002). Didactica limbii şi literaturii române în învăţământul primar, Bucureşti, Ed. Corint.
103. Sivin-Kachala, J. & Bialo, E. (2000). Research report on the effectiveness of technology in schools (7th ed.). Washington,DC: Software and Information Industry Association.
104. Steinberg, E. R. (1991). Computer-assisted instruction: A synthesis of theory, practiceand technology. Hillsdale, NJ: Lawrence Erlbaum.
105. Tancock, S., & Segedy, J. (2004). A comparison of young children's technology enhanced and traditional responses to texts: An action research project. Journal of Research in Childhood Education, 19, 58-65.
106. Ungureanu, D (1998). – Copiii cu dificultăţi de învaţare, Bucureşti, Editura Didactica si pedagogică.
107. Ungureanu, D.(2000). Educatia integrată şi şcoala incluzivă, Timisoara, Editura de Vest.
108. Vasilache Gh. N.(2006). Ghid ortografic şi ortoepic al limbii române. Ediţia a II-a Iaşi. Editura Polirom.
109. Văideanu, G. (1988). Educaţia la frontiera dintre milenii, Bucureşti, Editura Politică, 1988.
110. Verza, E. (1983). Disgrafia si terapia ei, Bucuresti. Editura Didactica si Pedagogică.
111. Voogt, J., & McKenney, S. (2008). Using ICT to foster (pre) reading and writing skills in young children. Computers in the Schools, 24(3-4), 248-261
112. Vrăşmaş E, Stănică C.(1997). Terapia tulburărilor de limbaj – Intervenţii logopedice. Bucureşti. Editura Didactică şi Pedagoică, Ra.
113. Vrăsmaş, T.(2001). Educaţia integrată şi/sau incluzivă, Bucureşti, Editura Aramis.
114. Waxman C, Meng-Fen Lin Georgette M. Michko (2003) A Meta-Analysis of the Effectiveness of Teaching and Learning With Technology on Student Outcomes.North Central Regional Educational Laboratory (NCREL)
115. Weston, T. (2004). Formative evaluation for implementation: Evaluating educational technology applications and lessons [Electronic version]. American Journal of Evaluation,25(1), 51- 64.
116. Wiener R (1990). Computers for special education, TechTrends 35(4), 18-22.

117. Zhang, Y. (2000). Technology and the writing skills of students with learning disabilities. Journal of Research on Computing in Education, 32(4), 467-478.

ON-LINE BIBLIOGRAPHY:

1. Ala-Mutka, K., Redecker C., Punie Y., Ferrari A., Cachia R., Centeno C. (2010). The Future of Learning: European Teachers' Visions, Report on a foresight consultation at the 2010 eTwinning Conference, Seville [www]http://ftp.jrc.es/EURdoc/JRC59775_TN.pdf
2. Behrmann, M., & Jerome, M. K. (2002). Assistive technology for students with mild disabilities: Update 2002. ERIC Digest. Retrieved May 12, 2005, [www]http://www.ericdigests.org/2003-1/assistive.htm.
3. Blurton, C. (1999). New directions of ICT-use in education. UNESCO"s World Communication and Information Report 1999. URL: [www]http://www.unesco.org/education/educprog/lwf/d1/edict.pdf
4. Burgstahler, .S. (2007). Universal Design in Education: Principles and Applications. [www] http://www.washington.edu/doit/Brochures/Academics/ud_edu.html
5. Christensen R., Knezek, G. A. (2009). Construct Validity for the Teachers'Attitudes Toward Computers Questionnaire [www] http://www.eric.ed.gov/PDFS/EJ844212.pdf
6. Collier E. S. O. (2004). The Enhancement of the Teaching and the Learning of the Sciences in Secondary Schools. Using Computer Assisted Instruction, [www]http://members.aol.com/esocollier/computer- assistedinstruction.html
7. Cotton K.(1997). Computer-Assisted Instruction, School Improvement Research Series, http://www.borg.com/~rparkany/PromOriginal/ETAP778/CAI.html
8. David R. W. (1994). PLATO: The Emergence of Online Community [www]http://thinkofit.com/plato/dwplato.htm
9. Făt.S., Labăr A.V. (2009). Eficiența utilizării noilor tehnologii în educație. Edutic 2009 - Raport de cercetare evaluativă - Centrul pentru Inovare în Educație [www]http://www.elearning.ro/resurse/EduTIC2009_Raport.pdf

10. Dolan, R. P., Hall, T. E. (2001). "Universal Design for Learning: Implications for Large-Scale Assessment." IDA Perspectives 27(4): 22-25. [www]http://www.cast.org/system/galleries/download/byCAST/udlassessment.pdf
11. Knezek, G. and Christensen, R. (1997). Attitudes Toward Information Technology at Two Parochial Schools in North Texas. Denton, TX: Texas Center for Educational Technology. [www]http://courseweb.unt.edu/gknezek/studies/techrept/TR97-2.htm.
12. McLeskey, J., & Waldron, N. L. (2002). School change and inclusive schools: Lessons learned from practice. Phi Delta Kappan, 84(1), 65-73. Retrieved September 18, 2002 [www]http://web14.epnet.com/citation.asp
13. O'Dwyer, L.M., Russell, M., Bebell, D., and Tucker-Seeley, K.R. (2005, January). Examining the relationship between home and school computer use and students' English/Language Arts test scores. The Journal of Technology, Learning, and Assessment.Vol.3,No.3. [www]http://.bc.edu/research/intasc/studies/USEIT/pdf/USEIT_r10.pdf
14. Papadopoulos I., (2004). Geometry problem-solving in a computational environment.advantages and reservations. [www]http://www.icme organisers.dk/tsg18/
15. Peterson-Karlan, G. &. Parette H.(2007). Supporting struggling writers using technology: evidence-based instruction and decision-making, Technology-Based Tools to Support Writing [www]http://www.cited.org/library/resourcedocs/TechnologyToSupportWritingSummary.pdf
16. Russell, Beale &Mike Sharples.(2002). Design Guide for Developers of Educational Software. [www]http://www.lsri.nottingham.ac.uk/msh/Papers/Design%20Guide.pdf
17. Rose, D.&Meyer, A. (2002), Teaching every student in the digital age: Universal Design for learning. [www]http://www.cast.org/teachingeverystudent/ideas/tes/chapter4.cfm
18. Scrimshaw, P. (2004). Energizing teachers to make successful use of ICT. London: BECTA. (Electronic version) November, 2005, [www]http://www.becta.org.uk.

19. Silver-Pacuilla, H. (2006). Moving toward solutions: Assistive & learning technology for all students. Washington, DC: National Center for Technology Innovation. [www]http://www.nationaltechcenter.org/
20. Waxman, H.C., Lin, M.F., Michko, G. M. (2003). A Meta-Analysis of the Effectiveness of Teaching and Learning With Technology on Student Outcomes, University of Houston, Learning Point Associates. [www]http://www.ncrel.org/tech/effects2/
21. *Clicker 5, [www]http://www.cricksoft.com/uk/products/clicker/support.htm
22. *Dragon Naturally Speaking, [www] http://www.nuance.com/dragon/index.htm
23. *Inspiration & Kidspiration, [www] http://www.inspiration.com/Kidspiration
24. * Kurzweil Educational Systems, [www]http://www.kurzweiledu.com/default.html
25. *TestTalker, [www]http://www.freedomscientific.com/LSG/products/testtalker.asp
26. *Talking Word Processor [www]http://www.readingmadeez.com/products/talkingwordprocessor.html
27. * Universal Design for Learning [www]http://www.cast.org/udl/index.html
28. *WYNN,[www] http://www.freedomscientific.com/LSG/products/wynn.asp
29. ***Official Journal of the European Union 30.12.2006 [www] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:en:PDF
30. ***Consiliul Uniunii Europene ,Jurnalul Oficial al Uniunii Europene (2009), [www]http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2009:302:0003:0005:RO:PDF
31. *** Consiliul Uniunii Europene ,Jurnalul Oficial al Uniunii Europene (2010), [www]http://ec.europa.eu/education/index_en.htm
32. ***Ministerul Educaţiei şi Cercetării, Consiliul Naţional pentru Curriculum Programe Şcolare pentru clasa a II-a şi a III-a, Limba şi literatura română [www]http://www.edu.ro/index.php/articles/curriculum/c539+587/?startnum=41
33. *** RAPORT CU PRIVIRE LA SITUAŢIAEDUCAŢIEI INCLUZIVE ÎN ROMÂNIA (2009) [www](http://www.cedu.ro/programe/parteneriat/respdf/raport.pdf)